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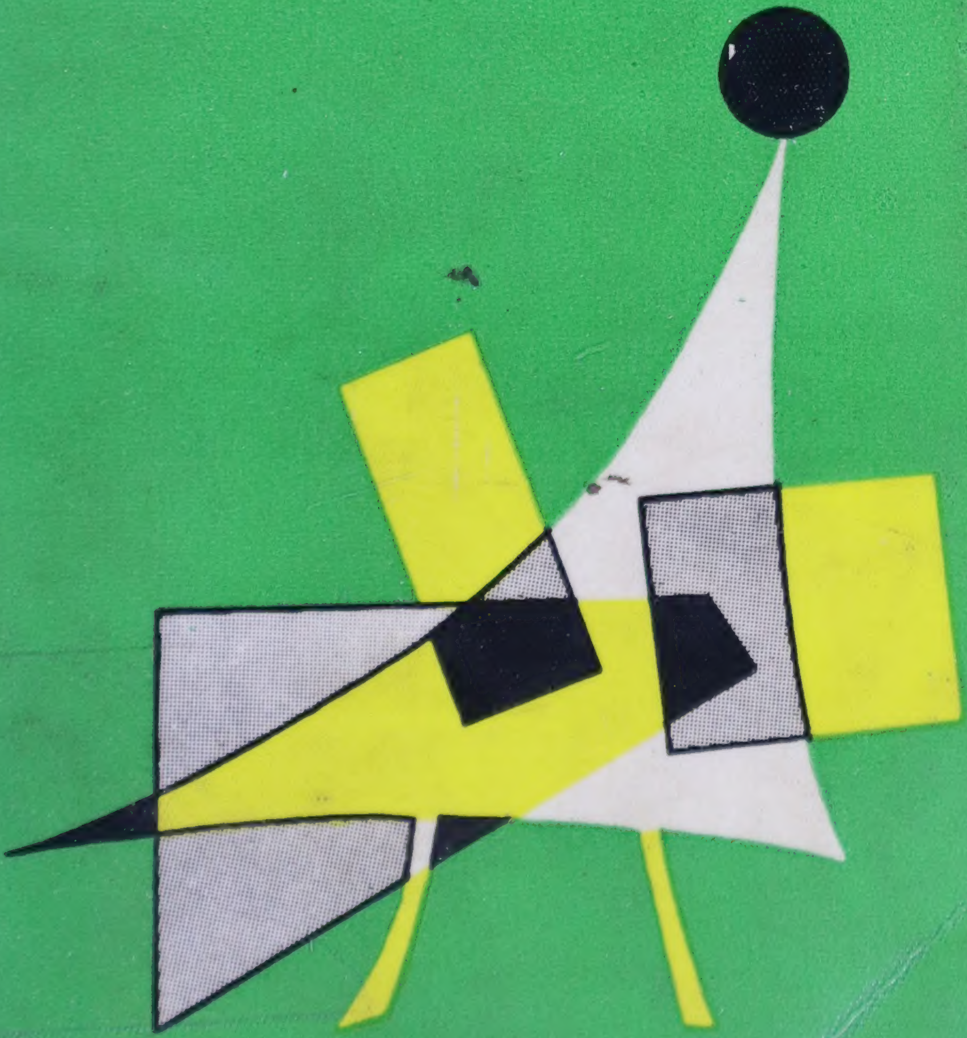
Educational Psychology

Edited by
CHARLES E. SKINNER



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Educational Psychology

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by Charles E. Skinner

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Preface

There have been countless new developments in the field of educational psychology since the publication of the first edition of *Educational Psychology* in 1936. During this period, much has been written dealing with content, trends, and changing emphases in educational psychology. Notable among these writings are "Learning and Instruction," *The Forty-ninth Yearbook of the National Society for the Study of Education,* Part I; the annual reports in the *Annual Review of Psychology;* the *Review of Educational Research;* Dr. R. L. Skeen's study of the relative value of psychological topics in the education of elementary teachers; and Dr. Howard Jordan's study and discussion of the relative value of the contents of twenty-five current works on educational psychology.

The Committee Reports of the Division of Educational Psychology of the American Psychological Association have been directed to the nature of this discipline, its objectives and teaching procedures. Contributions to a better understanding of this discipline and its central importance in the professional education of teachers have been made by Trow, Noll, Sister Mary Amatora, Symonds, Blair, Rivlin, Jones, Stroud, Haggard and many others.

Significant among the new trends are an increasing concern about the socialization of learners and the importance of the group process; greater emphasis on how children learn; increased recognition of the fact that learning is influenced by learning readiness, feelings of self-esteem and "belonging"; consideration of the psychological climate of the classroom and the needs of the learners; concern with the individual's own learning progress rather than comparison of his scores with standard norms; greater emphasis on an over-all appraisal or evaluation of the child's entire learning pattern rather than on measurement of isolated fragments of learning or behavior; a more realistic position regarding such matters as permissiveness, discipline, and the IQ; more emphasis on child development and mental hygiene concepts and principles in school practice; more emphasis on teaching as the guidance of learning experiences and activities and on guidance as a new dimension in creative teaching; and a growing emphasis on the relation between self-understanding and understanding of others.

This fourth edition takes cognizance of the reports, researches and discussions relevant for our purposes. In this major revision three new chapters have been added and four chapters that had been included in the previous edition have been discontinued. Most of the chapters have been completely rewritten, better organization has been achieved, references have been brought up to date and the questions and problems given at the end of chapters have been revised and expanded.

The Editor assumes full responsibility for the selection of the contributing authors to this volume, the organization of the chapters, and the Index.

Acknowledgments are gratefully made to authors and publishers who gave us permission to quote from their publications. The Editor is especially grateful to the contributors to this volume for their splendid cooperation and to Mr. Edgar P. Thomas, Mr. Ronald Nelson, Mr. David W. Lynch, and Miss Francesca Tillona of the staff of Prentice-Hall, Inc., for their personal interest and helpfulness at all stages of the project.

CHARLES E. SKINNER

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Educational Psychology

I

INTRODUCTION

CHAPTER 1

Nature and methods of educational psychology

G. LESTER ANDERSON
UNIVERSITY OF BUFFALO

ON A TYPICAL WEEKDAY in the months of September through May, all over our land, more than a million teachers meet in more-or-less formal situations with somewhere between 30 and 40 million children, young people, and adults. These 30-odd million expect, in some degree, to learn something. They normally meet in classrooms under the guidance or direction of teachers, because they (or others) assume that their learning will be enhanced by doing so, instead of depending on the informal learning that goes on at all times.

These teachers, by virtue of their training, have a special skill in helping others learn. Of what does this skill consist? How is it acquired? One aspect of the teacher's skill is acquired through the study of educational psychology. It is our purpose in this introductory chapter to tell something of the nature and scope of educational psychology and what its study may be expected to contribute to the preparation of the teacher to do his work.

We have said that teachers meet with students with the expectation that these students will learn. *Learning* is a word in common speech, but it is also a psychologist's word. The psychologist is interested in how learning takes place; so is the teacher. As a scientist, the psychologist studies learning so that he can know more and more about it. It is the knowledge he gathers and the principles he develops out of this knowledge that become a subject of study for the teacher so that the latter can better understand how his pupils learn and how to guide or direct their learning.

Learning as such, however, is not the only topic in which the psychologist is interested; nor is it the only topic from the field of psychology that the teacher does or should study. It is, however, at the heart of the teacher's education as a skilled, professional person, because the teacher is first of all one who stimulates, motivates, guides, directs, tests, and evaluates the learning of others.

The task of the teacher

We have suggested above the dimensions of the teacher's task. It is not enough for a teacher to be confronted by a pupil and for the teacher to say "learn." Nor is it sufficient for the teacher to "tell the student what he is expected to learn" and say to him "remember." The teacher's task can be described under three broad categories.

Selecting and organizing material. The teacher first has to select and organize the material to be learned—simple when said, but actually a complicated, complex task. We used the words "material to be learned," but what is learned is not just subject-matter content. The pupil may be learning a date in history, an intellectual skill such as reading, a motor skill such as typing, a new interest, or even a system of values. Whatever he is learning, somewhere, somehow, someone has made a determination that certain material or experiences will be brought before the pupil, at a certain point of time in his school life, and in a certain order. We ask the question: What should the child learn? The answers can or should be given, in part at least, as we begin to know something about the particular child we are teaching. Is the normal third-grade child able to learn long division? Can the average ninth-grade child understand chemical valences? Can a superior high-school student master calculus? Do children learning to read learn better if the teacher starts with the alphabet or with "whole words"? Do children learn better how to write the English language by spending a higher proportion of their time on English grammar than on writing compositions, or vice versa?

These questions are but illustrative of the hundreds that must be answered if teachers are to do their work. The answers should be based on specific information. A part of this information has been gathered by educational psychologists and set down as general principles of child growth and learning. This body of knowledge then becomes an indispensable part of the teacher's professional equipment; without it, he could not render the professional judgments essential in selecting and organizing the material that pupils are to learn.

This process of selecting and organizing material we call "building the curriculum."

Guiding and directing learning. The teacher guides or directs the learning of his pupils. The normal course of events in the classroom has often been described under the rubric, "assign-study-recite-test." This formula would seem to make the teacher one who tells the pupils what they are to study, watches them study it, hears their lessons, and then questions them to see what they have learned. Undoubtedly, much that is learned in schools is learned under some such sequence of events. But we have become somewhat more sophisticated about the circumstances under which optimum learning takes place than is implied in the rubric above. Look about you for a day, in and out of school or college. Observe a four- or five-year-old child who has never been in school. He has learned to walk and talk, feed and dress himself, and get what he wants from parents or pals in one way or another. Observe the young men on the football field. How is the coach teaching them to play the game? Watch a group in a chorus or in a dramatic organization. What is happening that develops their skill as singers or actors?

Psychologists have studied *how* people learn. They have investigated the nature of motivation and its relation to learning. They know something about how learning should be initiated. Sometime watch a first-grade teacher introduce a group of children to the reading process. Or watch a physical education teacher giving a first lesson to a group of children learning to swim. If these teachers are highly skilled, they will show a knowledge of motivation and the proper methods of initiating learning.

Psychologists have much to say about motivation of learning. and about drill or practice. They have formulated principles about the use of rewards and punishment. They can tell us something about the material we use in teaching—when and how films can be used, how many new vocabulary words in a foreign language should be presented in a single lesson, what can be done to minimize forgetting. All these items of information and more are relevant to the teacher's task as one who guides the learning of others.

Evaluation. The teacher wants to know how well he has done as a teacher, how well his pupils have learned. So do his pupils and their parents. So, ultimately, does the college he enters and his employers, and the public at large continually asks how well our schools are doing. Thus, the teacher must test his pupils and evaluate their achievement.

Teachers prepare their own tests and administer them, as well as select and use tests made by others. They observe the work of their students and make judgments about it; they pass some students and fail others. They make reports to students and parents. They prepare records which help to decide who should be admitted to college and who should not. The psychologist has investigated these matters, too. He has studied how to measure the basic aptitudes of people—intellectual, mechanical, clerical, musical, and so forth. He has studied how to test achievement. He has devised techniques for recording information gathered and for interpreting it. The teacher must study the psychologist's findings to equip himself to perform this task of evaluation with professional skill.

Educational specialization

We have written primarily of the work of the teacher. However, although the teacher is the most important educator, we must give attention to specializations that have grown up in education as they have in other occupations and professions. There are supervisors of instruction, curriculum coordinators, guidance officers, research technicians, principals, and superintendents. To each of these, the values of educational psychology pertain in one way or another just as they do to the teacher. The guidance officer or counselor is, essentially, an applied psychologist. Therefore, this book devotes a section to his work just as it does to the work of the teacher.

The teacher: a professional person

The assumption basic to the statements made above is that the teacher is a professional person, operating with professional skill and exercising professional judgment. It is also generally assumed that the exercise of professional skill and judgment rests upon basic knowledge, basic principles, and basic laws that are the products of scholarly activity and, insofar as possible, scientific research. Knowledge when so derived and gathered together becomes what is called an academic discipline. The field of psychology is one of these, and is one of the chief supports, along with history, philosophy, sociology, and other disciplines, for the professional work of the teacher.

What is educational psychology?

Let us deal more explicitly, however, with the field of educational psychology. An educational psychologist is an applied psychologist. He is interested in the fundamental laws of human behavior, but he is also interested in their applications to education. "Educational psychology is a subject to be studied, an area or field of knowledge, a set of applications of laws and principles from a field of knowledge to a social process, a set of tools and techniques, and a field for research."[1]

Psychology may be defined in its simplest form as the study of behavior. The psychologist is ultimately interested in formulating the laws of human behavior. He assumes, however, that all living creatures operate, act, or behave according to laws. Consequently, he often studies the behavior of animals because he can more easily control the conditions under which they behave. He collects his data about animal behavior under controlled conditions, and formulates his hypotheses or generalizations. These can then be investigated further to determine if they pertain to human behavior. The psychologist is both a natural scientist and a social scientist. He conducts his investigations, gathers his data, and reaches his conclusions in exactly the same manner as the physicist or biologist. He expects to meet all the rigorous criteria of scientific investigation, but because he studies human beings and because the sociability of human beings is a primary datum about them, the psychologist is also a social scientist. He can also be classified with the investigators whom we call sociologists, anthropologists, economists, and political scientists.

The quickest way to learn what is encompassed by educational psychology, perhaps, is to scan the table of contents of this book. There you will find that the subject matter has been placed under these broad groupings:

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[1] G. L. Anderson, "Educational Psychology and Teacher Education," *Journal of Educational Psychology*, XL (May, 1949), 275-284.

1. An introductory section, of which this chapter is one, defines the field of educational psychology and presents some of its applications to the task of the educator.
2. The nature of personality and the adjustment problems of both normal and handicapped children are dealt with in the second section.
3. The growth and development of children and adolescents is the subject matter of the third section. This section deals with physical, mental, emotional, personal, and social development and the development of attitudes, interests, and values.
4. The nature of learning is presented in the fourth section. This section includes a theoretical chapter and material on specialized aspects, such as motivation and transfer of learning. Applications of learning principles to the specific kinds of learning that children and adolescents are expected to attain through education are discussed.
5. The last section of the book describes some of the tools of research and evaluation. It tells how these are used in education. One chapter states the nature and extent of individual differences and their meaning for education.

It will be discovered that some of the chapters deal with the content of the field of educational psychology; the other chapters interpret this content as it applies to the work of educators.

Research in educational psychology

A quick review of any of the chapters of this book will also reveal in some detail not only the content of educational psychology but also the way the psychologist has worked to unearth his facts and to formulate his generalizations or principles. Let us illustrate here, however, the educational psychologist's methods and the kinds of interpretation he makes, by describing four investigations.

Measuring intelligence. It is of considerable practical importance to the schools to know who is educable; or, stated better, to know to what extent a given child can profit from education. The French psychologist. Binet, who was director of the psychological laboratory at the Sorbonne, was given the assignment by his government early in this century to find some practical means of identifying the ability of children as they entered school. Earlier, other psychologists had attempted to predict ability to learn, or what we commonly call intelligence, by measuring such things as sensory acuity. Binet adapted their methods of measurement, but applied them to more complicated aspects of behavior. He devised a series of "tests" in which children were asked to do certain things that they might have been expected to learn how to do in the normal course of their daily living. He determined what a typical, or average, child of a given age could do, and arranged his test in a series of scales. In this way, he could compare the performance of any given child with the normal or average child. He thus developed the first practical measure of intelligence and provided a tool by which children could be classified. Binet published his first tests in 1905. His contribution lay in his use, for testing purposes, of tasks that required a complex of skills.

As Binet's work became known in this country, his tests were adapted to the situations in which American children live—they were "standardized" for American children. Lewis M. Terman and other psychologists at Stanford University prepared the Stanford-Binet revision published in 1916. The ideas and work of Binet led to group tests of intelligence that were widely used by the Army in World War I for the classification of recruits. Today, scarcely any American child or young adult has not at some time been administered an intelligence test. The full gamut of their use and meaning is discussed in a later chapter. The fundamental contribution to testing, however, had been made by Binet in the first years of this century.

Does practice result in learning? A perennial question in education is the effect of practice or drill upon learning. E. L. Thorndike, who is generally considered the greatest of educational psychologists, was interested in this question. Thorndike, as a scientist should, stated the question in explicit terms so that he could expect to get an explicit answer. He asked:

> What happens when a man is confronted again and again by the same situation? What would happen if a man could be subjected to the same situation say 1,000 times, with everything else in the world and in him kept constant save the thousand repetitions of the situation and the changes, if any, which they produce in him? We are, that is, seeking to determine the influence of the mere repetition of a situation, all else being equal.[2]

Thorndike asked a subject to sit, eyes closed, with a pad of paper and a pencil and draw with one quick movement a line four inches long.

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[2] From *Human Learning*, by Edward L. Thorndike. Copyright, 1931, The Century Co., p. 8.

He then reported the results. In twelve sittings, in which the number of lines varied from 171 to 200, there was no significant change in the median length of lines from the first to last sitting. Thorndike had a number of subjects perform this task and other similar tasks.[3] He concluded from this experiment that the repetition of a situation in and of itself does not cause learning. He states:

> So far as I can now see, the repetition of a situation in and of itself has no selective power. If a certain state of affairs acts upon a man 10,000 times, he will, so far as any intrinsic action of the 10,000 repetitions is concerned, respond in the same way to the last thousand as to the first.[4]

Thorndike then went on to perform other experiments in which he varied the conditions under which tasks were performed. He studied particularly the effect of the consequences of an act, such as informing a subject that his response was "right" or "wrong." The effect of these consequences can be interpreted as "reward" and "punishment." Thorndike concluded as a result of these experiments that right responses are established largely by rewards and that punishment has little or no effect in causing wrong responses to be eliminated.[5]

These experiments and their conclusions, if true, have tremendously important implications for methods of teaching. They tell something about the place of practice or drill in teaching and the use of rewards and punishment in the classroom.

Transfer and forgetting. The conditions under which something already learned facilitates or impedes new learning are the conditions under which what is called "transfer of training" occurs. It is also known that new learning may make the recall or remembering of old learning more difficult. This is called "retroactive inhibition" and is one facet of "forgetting." Both of these topics have considerable significance for teaching, because we want what we teach and others learn to have maximum usefulness; we do not normally want what we teach to be forgotten.

Swenson investigated these topics under normal classroom conditions.[6] Her subject were 332 pupils enrolled in fourteen second grades in the schools of St. Paul, Minnesota. The material learned consisted of the 100 addition combinations, the direct and reverse of the number combinations from 0 + 0 through 9 + 9. The factor that was varied was the organization and method of teaching of these facts. Basically, two approaches were made. In one, pupils learned their combinations as discrete items of fact in which the answers were authoritatively identified; the learning time was largely devoted to practice or drill. In the second, the facts were organized so that pupils could find the relations among facts (for example, that 5 + 4 and 4 + 5 were really the same fact), they were encouraged to do this, the learning time was largely spent discovering these relationships, and drill or practice was minimized.

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[3] *Ibid.*, pp. 8-15.

[4] *Ibid.*, p. 14.

[5] *Ibid.*, pp. 30-46.

[6] E. J. Swenson, "Organization and Generalization as Factors in Learning, Transfer, and Retroactive Inhibition," in *Learning Theory in School Situations* (University of Minnesota Studies in Education, No. 2 [Minneapolis: University of Minnesota Press, 1949]), pp. 9-39.

A detailed testing program was prepared and elaborate statistical analyses were made. Swenson developed detailed conclusions concerning learning, transfer, and retroactive inhibition, and pointed out their implications for learning theory and for education. In summary, however, she concluded that "meaningful" methods of instruction are superior to those based on "connectionism." These two terms will be discussed in later sections of this book.

Swenson's study is noteworthy for the investigation of fundamental issues in the psychology of learning in the context of a school subject and a school setting. The findings are, in turn, of fundamental significance in developing a methodology of instruction.

Social psychology of classrooms. Our final illustration is in the borderland between sociology and psychology. It could be classified as an investigation in the social psychology of education. The school has a deep concern that its pupils develop as normal, healthy, social personalities. What are some of the conditions associated with the formation of "social groups" in a high-school class? What procedures are effective in bringing about changes in these groups if such are educationally desirable?

Lloyd Allen Cook, in cooperation with a high-school social studies teacher and a personnel officer, studied some of these matters in a small Midwestern suburban residential community.[7] A tenth-grade social studies class enrolling 44 pupils was the group studied. The basic problem was to determine the groupings within the class, namely, "*who*

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[7] L. A. Cook, "An Experimental Sociographic Study of a Stratified Tenth Grade Class," *American Sociological Review*, X (1945), 250-261; reprinted in A. P. Coladarci (ed.), *Educational Psychology, A Book of Readings* (New York: The Dryden Press, 1955), pp. 310-329.

ran with whom as an equal and an intimate," and to study these groups in terms of social stratification or "social class" levels of the students. Cook and his collaborators were also interested through the use of "individual guidance" and a "group management approach" to bring about changes in the associations among these students.

Cook first collected data on the home backgrounds of each of the students, his reputation among his peers, and his associations. From these data he was able to arrange the pupils into three groups of upper or near upper class, middle class, and low class and to show the interpersonal groupings of the students. Diagrams showing these associations are known as *sociograms*. Cook found that three-fourths of these associations fell within the class and all within the school. He goes on to say that "a majority were within own sex, own status level, with *out choices* being most common in boy-girl attractions, *up choices* most frequent in claims on high-ranking 'stars' by middle-class children." He also identified *isolates* (students not chosen as a friend by any classmate), the *pair* (mutual choice), the *chain* (a series of one-way choices), and *cliques*, both open and closed.

In the second aspect of the study, the efforts to produce changes in the informal class organization through guidance and group activity were successful, but Cook does stress that the impressive thing is the "stability of group structure." He concludes that "*our data support the hypothesis of class level stratification among 'teen age children.*"

This study by Cook is, as we stated earlier, an investigation into the social psychology and sociology of the school. It shows some of the effects of the broader environment, the culture and mores of the community, upon the social life of students. It explores some of the methods by which schools can work to change this group life, but concludes that these efforts can be only partially successful, because of the broader forces at work. Again, such findings, as they are supported by other research, can have important implications for the development of the entire school program as well as for the work of teachers and specialists (notably, counselors) in the school.

Educational psychology—an academic discipline

We have been able to sketch only in barest outline the work of four investigators. These four investigations, in turn, are representative in only a very small way of thousands that have been made in the field of educational psychology. They do, however, suggest these points about educational psychology as an academic discipline and a field of study:

(1) Educational psychology is focused upon the human behavior. (2) It is a body of facts or information that has resulted from observation and investigation. (3) This body of knowledge can be summarized or generalized into principles or theories. (4) Educational psychology has developed a methodology by which investigations are made, information is discovered, hypotheses are tested, and theories are derived. (5) This methodology is useful in arriving at the solution of educational problems as they present themselves. (6) This information, this knowledge, these principles, this methodology, constituting the substances of educational psychology, provide a base for educational theory and educational practice.

Methods of educational psychology. Educational psychology uses the methods of science. Scientific investigations may be described as being: *precise, objective, verifiable by a competent worker, made by experts,* and *impartial in that the experimenter is not swayed by prejudice or opinion.* In their researches, educational psychologists approach their problems with a scientific attitude, and they make use of scientific methods in their collection and treatment of data. The methods used are many and varied. The particular method used is determined in part by the nature of the problem to be studied, in part by the orientation and resourcefulness of the research worker, and in part by the availability of materials and subjects or other limiting factors, such as time or financial resources. New methods and variations of methods and techniques appear every year. Some methods are useful in securing subjective data; others enable us to collect data more objectively. Some are relatively uncontrolled; others are highly controlled. For the purposes of this text, only some of the better known types of methods will be noted.

The experimental method is often considered to be the method *par excellence* for use in certain researches. Yet the experimental method may be of many designs. In some kind of educational situations, the problem can be studied in the laboratory, where theoretically all variables are controlled except the one under study. Thorndike's work on the effect of practice, which was described above, is an example.

Some problems do not lend themselves to study in a psychological laboratory; these may be better studied through the use of parallel groups that have been equated on the basis of variables judged to be significant. One group, the experimental group, is subjected to a certain experience or kind of treatment, whereas the control group does not participate in or even know about the special training given the experimental group. At the end of the training period, both groups are given the same final test and, on the basis of results obtained from the two groups, conclusions are drawn. The study by Swenson on transfer and forgetting is an example of this type of experimentation.

Much experimentation has been done with curriculum materials in which evaluation of results may or may not be based on precise measurements. In John Dewey's Experimental School at the University of Chicago, more than half a century ago, no valid scientific tools were available for measuring results, yet Dewey's keen powers of observation led him to certain conclusions that have lasted for a long time. Today, the educational psychologist should begin with a clear notion of the objectives spelled out in terms of behaviors to be developed, and then he should devise or use tests and techniques that would enable him to appraise the outcomes of instruction, that is, to find out to what extent the objectives or educational values had been realized.

The normative-survey method is really a variant of the experimental approach to research. Here the experimenter seeks to evaluate mass, or group, data in terms of standard norms. This method is particularly useful in shedding light on the nature and amount of individual differences and on the appraisal of school, grade, or age data. The normative-survey method makes use of various tests and techniques in the collection of data, such as standard tests, the interview, check list, questionnaire, inventory, anecdotal records, biographical and autobiographical records, sociometric techniques, rating scales, and direct observations. Many teachers and school administrators interested in action research use this method because it requires less technical skill and know-how than laboratory and clinical studies and because teachers and school administrators are primarily concerned with problems of immediate concern in their schools. The research of Cook on the social structure of a class is one example of this type of investigation.

The developmental, or *genetic, method* has been used extensively in the study of growth and development. When the child is studied longitudinally over relatively long periods of time, data are secured which relate to his unique development and which must be interpreted in terms of his own growth record. Studies of development in locomotion, language, interests, and adjustment of individual children usually employ this method. It is obvious at once that the investigator using this method must make experiments, conduct interviews, test, or otherwise collect data that will throw light on the problem under consideration.

The clinical method is generally used in the study of specific learning, personality, or behavior difficulties of a complex nature and utilizes various clinical procedures and techniques appropriate for the case under study. Obviously, the goal is to detect or identify the specific needs of the client, the cause or group of causal factors operating to produce the difficulty and, of course, what help for the client is indicated. It is often an intensive, multiple-approach study of a single individual. The complete study may involve general observations, an interview, the use of various tests of intelligence, aptitudes, personality, attitudes and interests, a physical examination, a psychiatric examination, a sociological report on the home situation, a history of the case, a case conference report, and other investigations. The complete assembly of facts and information is often referred to as a *case study*.

The clinical method is particularly useful in the study of such school problems as the following:

1. The severe reading-disability case
2. The severe stutterer or stammerer
3. The chronic delinquent
4. The severely emotionally disturbed

It should be pointed out here that only a relatively small percentage of problems need to be studied by specially trained school psychologists, guidance workers, or school psychiatrists, although all of these specialists could make vital contributions through preventive mental hygiene.

Summary: aims of educational psychology

The general aim of educational psychology is to provide a body of organized facts and generalizations that will enable the teacher to realize increasingly both cultural and professional objectives. An analysis of the general aim reveals *many* specific aims. Some of the more important of these specific aims, or results that may be expected from the study of this subject, are the following:

1. To develop a conviction and realization of the extent that growth can be promoted, learnings acquired, social behavior improved, and

personality adjustments effected. The realization of this objective will produce an increasing appreciation of what educational psychology contributes to the teacher.

2. To assist in defining and setting up educational objectives and standards in terms of desirable behaviors (conduct, attitudes, and so forth) that ought to be the goals of all teaching efforts. If the teacher knows what the desired outcomes should be, he can set up the appropriate situation (curricular materials, teaching procedures, and so on) for bringing them about.

3. To aid in developing an impartial but sympathetic attitude toward children, so that their behavior will be regarded objectively.

4. To assist in achieving a better understanding of the nature and importance of social relationships and the methods of developing in children such modes of social functioning as getting along with others, participation in group efforts, and cooperation.

5. To provide a body of facts and principles that can be used in solving the problems of teaching: how the materials of instruction can best be selected and organized into a graded series of problem-projects, units, or contracts; how these materials can be used intelligently as means in developing the desired outcomes; how the learning process can be so guided that the materials and methods will not obstruct learning; and how the entire process can be directed so that what is learned functions not only here and now, but anywhere and anytime, in school or out.

6. To aid in affording the teacher a better perspective for judging both the results of his own teaching and the educational practices of others. Educational psychology helps provide a better background for understanding the total job of teaching in all its intricacies, the importance of goals or the need of a working philosophy, a knowledge of usable materials and means (available or possible), the most effective use of these materials, reliable and valid ways of evaluating outcomes or results, and so forth. Educational psychology helps develop a scientific, problem-solving attitude toward the problems of education. It also aids materially in training individuals to think *psychologically* about problems of human conduct and education.

7. To furnish the teacher with the necessary facts and techniques for analyzing behavior—both his own and that of others—to the end that normal adjustment may be facilitated and growth in personality effected.

8. To assist in setting up, defining, and maintaining progressive teaching procedures, guidance programs, and functional forms of organization and administration.

This volume of educational psychology presents much factual material and many foundation principles for realizing the aims set forth above. Whether or not these goals will be attained depends not only on the textbook but on *how the subject is mastered.*

QUESTIONS AND EXERCISES

for discussion and study

1 Teachers generally regard educational psychology as the most important subject studied in their professional preparation for teaching. Carefully inspect and analyze two or three basal texts to find reasons why this opinion may be valid. Discuss these reasons with other members of your group.

2 Observe a group of school children in the classroom and at play a few hours a day for one week. Then write a report of your observations. Find out from class discussions if the right things were observed.

3 Spend one afternoon or evening a week in a social agency, a scout troop, or church group with children or adolescents. Discuss with your group the situations and problems that have arisen in connection with these visits.

4 Attend a class taught by one of the best teachers in your community for the purpose of determining what professional orientation, skills, personality qualities, and other factors seem to make him a superior teacher. Compare notes with other students in the class.

5 Learning the facts and generalizations of educational psychology does not always result in better teaching. Does the way in which educational psychology is learned have anything to do with functional learning? Discuss fully. How can educational psychology be made more functional in the work of the teacher?

6 The school should be "seen as an area of important social interaction among children." What does this statement mean to you?

7 Educational psychology, as a science, is composed of systematized facts and generalizations based upon researches in which scientific methods were used. Some of these methods have been briefly reviewed in this chapter. Examine them carefully to determine whether the classroom teacher can make use of any of them, even in a limited fashion, and, if so, how their use might render teaching much more effective.

8 Comment on the following statements:

a. Teachers are born, not made.

b. Teachers should be concerned with the dynamics of the child's behavior rather than with the behavior as such.
c. The teacher should respect each and every child as a person.
d. The teacher's personality is a very important factor in classroom behavior and learning.

9 Prepare a little dictionary of psychological terms used in this chapter. Keep the dictionary up to date as you continue reading this book.

10 How do academically superior students compare with poorer students in regard to the following:

a. Felt need for or purpose in the learning?
b. Study attitudes and interest in the learning?
c. Study skills?

Inspect the text for authoritative information on how to study more effectively; then evaluate your own study techniques in the light of this information.

11 Prepare a *check list* that might be used in helping teachers to discover what things trouble their pupils. Compare notes with other students to find out how to construct such a list. Have a number of children react to your check list; report your findings to the class. What are the limitations of such findings?

12 What does it mean to "understand" a child? Compare your answer with that given in Chapter I of *Helping Teachers Understand Children* (Washington, D.C.: American Council on Education, 1945).

13 Get from your library one of the more recent bound volumes of the the *Journal of Educational Psychology*. Study the tables of contents and read representative articles. Write a one-page review of the volume.

14 Evaluate the learning that resulted from the study and discussion of this introductory chapter. What is meant and implied by the term *evaluate*? What are some of the things you could do that would help you in appraising what you gained from the chapter? Compare notes with other members of the class.

SELECTED REFERENCES

for further reading

The following general references, containing much material pertinent to a course in educational psychology, should be consulted regularly by the student.

Coladarci, A. P. (ed.), *Educational Psychology, A Book of Readings*. New York: The Dryden Press, 1955.

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CHAPTER 2

Teaching: The art of guiding learning experiences

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THE PURPOSE OF TEACHING is to help people to learn. Each person learns, however, from his own efforts and experiences. A teacher may inspire a student to want to learn and may guide him in experiences from which he may learn some fact, attitude or skill, but the teacher cannot learn it for him. Each individual must learn for himself.

This book undertakes to describe and to explain the psychological nature of the process of learning and the conditions under which learning normally takes place. This particular chapter is intended to provide the reader with a brief preliminary view of the important role of the teacher as a guide in the learning experiences of his students. No one should expect to find here a detailed description of how he should teach. Each effective teacher develops his own ways of recognizing the needs currently felt by his students and of guiding them into and through experiences designed to result in learnings that will satisfy those needs.

There is no best way to teach. What a teacher should do at a particular moment is not something that can be determined from any scientific formula. It is the result of a thoughtful decision by the teacher himself, made in the light of all he knows about how people learn, what his students already know and are ready to learn, and the relative success he himself has experienced in trying various ways of helping students to learn similar things in comparable situations. Successful teachers, like other artists, develop their own ways of getting the results they seek. What they all have in common is the desire to inspire and to guide their students in experiences that will result in effective learnings.

The challenge of teaching

To the thoughtful young person who desires to invest his life in something really important, in a profession where he can make real contribution to the lives of people, teaching offers an unequalled opportunity and a supreme challenge. No other profession can provide such a person with deeper personal satisfactions. On the other hand, a person who has not yet matured beyond the childish stage in which he still wants to acquire everything for himself should not consider teaching. A good teacher does gain the sincere respect of those who know him and his work, and he may come to exercise tremendous influence in his community and nation, but he gains such recognition by inspiring and guiding the development of other people rather than by seeking power or material advantages for himself.

Good teachers are needed in all parts of the world. Every normal parent wants his children to have the best possible teachers. He may even change his occupation and move to another community in order to give his children better educational opportunities. A local Chamber of Commerce often tries to attract new industries and business by advertising that its community has good schools. The thoughful citizens of every American community recognize the vital importance of having good teachers in their schools, even though a few shortsighted persons may still be found who oppose paying the higher taxes necessary to employ such teachers. Fortunately, the public's recognition of the indispensable nature of the teacher's services and of the necessity of paying adequately for them is increasing rapidly. One can be proud today to be a member of the teaching profession.

The real rewards of the true teacher are not in the material things he can purchase or the physical pleasures he can enjoy on his salary, but in the deep satisfactions he feels in watching his students grow in their understanding of themselves and of their world, in seeing them develop self-reliance, initiative, and sense of responsibility, and in observing their learning of the facts, skills, habits, and attitudes that are involved in becoming constructive citizens in a modern world.

Although an American teacher can and should be proud of his own country, he does recognize that its programs, agencies, and institutions for the common welfare are not yet perfect. He is always hopeful that his students, through the inspiration and guidance that he and other teachers are providing them, will be able later to work out improvements that will make their communities and their world a safer, happier, and more wholesome place for people to live.

The teacher is the chief agent in a democratic community's efforts to improve itself. Although he finds deep personal satisfactions in helping individual students to develop their potentials and become productive citizens, he does not forget that he is employed at public expense to serve the needs of the entire community. He realizes, perhaps more clearly than most people, that habits of planning together and of cooperating harmoniously for the achievement of common purposes are the basic requirements for improving any home, community, nation, or world. His success as a teacher in a democracy is reflected chiefly by the development that takes place in his students of these habits of cooperating effectively in group planning and work toward common ends that all consider important. In no other profession does one have the opportunity so often to feel a deep assurance that his efforts are contributing to the development, not only of more efficient individuals, but of the cooperative attitudes, understandings, and habits from which happier homes and communities develop.

Individual differences and likenesses

One of the most important facts for any teacher to keep constantly in mind is that no two persons can ever be exactly alike. Nature has provided wonderfully complicated ways to insure differences in newborn babies, and the differences in the experiences that these individuals go through later develop still more and greater differences in them. As a teacher you cannot expect any two of your students to act, to speak, or to feel in exactly the same way about any experience or person.[1] Neither should you expect to teach in exactly the same way anyone else teaches. You should develop your own ideas of good teaching and your own ways of expressing those concepts.

Although no two individuals are exactly alike, there are some great similarities in all human beings. They are alive, they grow, they need food, they have energy to spend, they try to understand and to use what they find in their environment, and they are especially concerned by their relations with the other human beings they meet. One who wishes to be an effective teacher needs to understand the great similarities in human beings, as well as to recognize the specific differences that exist between individuals.

There are some classroom activities from which all the members of a class may derive benefits, other enterprises from which perhaps one-third of the members can learn something, and still other undertakings from which only one or two members of a group can possibly benefit. A teacher is constantly having to choose among the many different activities that are available for helping members of his class to develop and learn, but if he desires to be an effective teacher he must make these choices intelligently, rather than by chance or by habit.

To be intelligent in making choices among the multitude of possible learning activities, a teacher must first be clear as to his own purposes and reasonably confident regarding the relative usefulness of each activity for accomplishing his purpose in that situation. Since his own pupils differ somewhat from the pupils of any other teacher, and since his own purposes differ in certain respects from the purposes of other teachers, his own careful selection of classroom activities will undoubtedly differ from the equally intelligent selections made by other teachers. Each effective teacher is an artist, working with different human materials and experiences, and each is attempting to express his own educational beliefs and purposes through his selection of the learning experiences to be made available to his pupils.

If each pupil in a class were given during any year the particular opportunities most appropriate to his own needs, interests, understandings, skills, and capacities for growth, the differences between individuals at the end of the year would be far greater than at the beginning. If it were ever possible, however, for all the pupils in a class to have exactly the same learning experiences during a year, the differences between individuals would still be far greater at the end than they had been at the beginning of the year. Whatever their experiences may be, people grow more different. No teacher or school should expect to be able to reduce or to eliminate the differences in individuals.

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[1] A more detailed discussion of individual differences and their implications for teaching will be found in Chapter 25.

In a society with democratic ideals and practices, the differences in individuals make it possible for each person to contribute through his own special talents and interests to the welfare, progress, and enjoyment of all. If we all felt, thought, talked, and acted in exactly the same ways, life would probably become extremely monotonous, and many important things would never get done at all. An artist-teacher welcomes the differences he discovers in his individual pupils and tries to help each to develop his own potential capacities, not only to become a productive self-respecting person, but also to make his unique contributions to the development of a richer and more interesting life for all.

Teaching and learning

What is teaching? When is a teacher teaching? A simple but very incomplete answer might be that *when those things a teacher is doing are helping someone else to learn, he is teaching.* Although this statement is at least partially true, certain questions may well be raised regarding it. For example, if no one is learning anything from a teacher's activities, is it correct to say that he is teaching?

The relationship between teaching and learning is reasonably comparable to that expressed in the statement that a salesman is selling only when someone else is buying something. A traveling salesman may repeat his sales talk and demonstration to many prospective buyers before one of them ever signs an order for his wares. Was he *selling* when he was talking to the buyers who did not give him an order? If one of these buyers should mail him an order a few days later, does that change what the salesman did from "talking" to "selling"? Similarly, if a student thinks about what he and the teacher said and did today, and then after a good night's sleep "sees through" and solves the problem they discussed, might it not be fair to say that the teacher had been "teaching" after all—helping the student to learn?

In spite of some inadequacies in any simple concept of teaching, it is important to keep in mind that the quality of a teacher's teaching is directly related to the quality and value of the learning that is taking place in his students. A teacher's chief concern as a teacher must always be with the effects of his own activities on the learning activities and outcomes in his students. "What is the essential nature of learning?" becomes, therefore, a fundamental question for every teacher to study very seriously.[2]

A fruitful way to think about learning is to realize that it is essentially a natural process—a process of growing. Each newborn infant has within its system a powerful tendency to grow up—to become a mature adult. In order to grow up physically, however, a child must receive from outside his system the air, food, and water his body needs and is equipped to convert into energy, bones, muscles, and other organs. Every normal child comes into the world equipped with many complex, built-in regulatory systems. For example, one of these makes him breathe more rapidly when exercise has reduced his normal supply of oxygen; another makes him feel hungry when his system needs more food; and still another makes him feel thirsty when his body needs more liquids.

If something happens to prevent an individual from getting enough of the necessary outside materials during his growing years, he may not grow as rapidly or become as tall and heavy as he might normally have become. He will grow up to be a man, however, rather than some other kind of animal. He cannot grow up to be anything other than he was potentially as an infant. Inadequate foods or diseases can prevent his body from attaining its maximum potential development, but nothing can make him grow into something different from what he was potentially as a child.

The mental and social development of a human being are equally natural and are similar in many ways to his physical development. In order to develop intellectually and emotionally, each child must obtain many varied experiences with the people and objects in his environment. Each normal infant comes equipped by nature to learn from experience, with curiosity about the people and other objects around him, and with a strong tendency to interpret for his own needs and purposes the significance of everything that comes to his attention. He learns from his experiences, whether he ever has a "teacher" or not. What he actually learns from an experience, however, is determined in large part by the nature of the interest and readiness for further learning he has at the time, by the nature of the experience, and by the personal interpretations he is able to make of its relationships to his own purposes, needs, and satisfactions.

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[2] Extensive discussions of the nature of learning and development are presented in Chapters 7 to 21 of this book. Two other books that will be especially helpful to the teacher are: G. Hildreth, *Child Growth Through Education* (New York: The Ronald Press Company, 1948); and E. C. Kelley and M. I. Rasey, *Education and the Nature of Man* (New York: Harper & Brothers, 1952).

Intellectual and emotional growth, like physical development, are natural processes of maturation and do not take place suddenly. One can grow only in those directions that are natural for him, but growth even in those directions requires time. Unless a child has the potential interests and native abilities for becoming a scientist, no amount of special teaching and experience can develop him into a great scientist. Inadequate opportunities and unfortunate experiences could, however, prevent a child who is potentially a great scientist from ever becoming any kind of scientist. Learning is a natural process of growth toward maturity of the potential abilities with which nature has endowed the individual.

A child's learning about any particular object or person is not something that occurs suddenly in a particular school class. If a child feels a personal need, and if his previous learnings are adequate to support such new development, he may learn to recognize the word "cat" in the first grade. He may learn to spell the word in the second grade. His learning of "cat" usually begins, however, long before he ever enters any school. The mother or other familiar person who petted a cat during the infant's first experience with it, or who helped him to feel the cat's soft warm fur, was teaching "cat" and was guiding the child in a real learning experience. His knowledge and understanding of "cat" may even continue to develop in his adult life—whenever he feels a personal interest or need and has further opportunities for hearing or reading about this kind of animal or for having further experiences with it.

A good teacher can play important roles in the learning of an individual. He can (1) observe the individual and try to understand his present abilities, interests, and needs, (2) stimulate and encourage him to explore them further, and (3) help to provide further experiences of such a nature as he can probably use in satisfying the needs and curiosities he feels at the moment. The effective teacher is an artist at guiding a student's experiences in ways that will satisfy, at least in part, some of the needs he feels at that time. What a particular individual actually learns from an experience may be quite different from the things his teacher had expected him to learn. The new knowledge or interest gained by a person through an experience is always an outgrowth of his previous concepts and interests, rather than the particular growth that the teacher had hoped the experience might stimulate.

Teaching and learning at the high-school and college level are not essentially different in their fundamental nature and relationships from teaching and learning at the elementary-school level. Older learners have usually developed, however, certain habits and abilities that were not strong in earlier years. Older children have usually learned, for example, to sit still for longer periods of time. They have often learned to find certain kinds of information for themselves by turning to the dictionary or to other sources of information. Most of them have learned to depend more on themselves and less on what the teacher or textbook says for finding satisfactory answers to the questions in their minds. High-school and college students have even learned that there are some things they really want to understand which typical schools and colleges are not organized to help them learn. They have usually learned that they are not expected to ask a question about science in an English class or to ask a mathematics teacher to explain something in history.

A young child, until he has learned about academic specialization from repeated disappointments in school, does not hesitate to ask his teacher for almost any information for which he may at the moment feel a need. It is unfortunate that many children, even before they enter a high school, have almost given up trying to obtain from teachers some of the understandings for which they feel the deepest needs. This desire to understand life and people, this feeling of need to understand and to make intelligent use of his environment is one of the chief motivating forces behind all important growth in an individual's personal, social, and intellectual characteristics. Teachers and schools should consistently encourage and cultivate this zeal for understanding, rather than stifle or discourage it.

The most effective teachers, in high school and college as well as in the primary grades, are artists at recognizing, encouraging, and developing the normal desires of young persons to understand and make intelligent use of the things that appear to concern them. An artist-teacher can recognize and nourish a student's desire to develop more adequate understandings, even though the particular concern of the student at the moment may not be a part of the limited subject that the teacher was employed to teach.

Conditions that facilitate learning

Many of the chapters of this book discuss factors that affect the process of learning. A prospective teacher should examine carefully the interesting experiments that are described and the interpretations of their meanings that are given. This will make it easier for him later to select the instructional procedures that are most likely to help his students learn readily. No brief statement here of what happens when a person learns can adequately serve as anything more than an introductory over-all view of the psychological factors involved in learning, but such a preliminary glimpse may prove helpful to some readers. Later chapters and other readings will provide further details and clarifications of how a person learns.[3]

Each instance of learning involves the strengthening of a learner's tendency to respond in a certain way to a given set of circumstances. When a learner's tendency to act, to think, to speak, or to feel a certain way upon the reappearance of a particular situation grows stronger, he is learning. Some situations are easily recognized as having been met before, but others are not so easily recognized. A child may, for example, learn to say "cat" when the word is printed in small letters (c-a-t) on the blackboard, but he may not be able to recognize that it is the same situation when the word has been printed in capital letters (C-A-T) on a sheet of paper. To that child the situation is not the same. Without further learning he cannot be expected to make the same response that he learned previously to make to c-a-t on the blackboard.

The connections children learn to make first are between specific situations and specific responses. It is necessary for the child not only to recognize the situation confronting him before he can learn to make the appropriate response, but he must also be able to make the response itself. If a boy enters a first-grade class with an unusual name that is difficult to pronounce, the other children will have some difficulty in learning to call him by name. If John, for example, is told that this new boy's name is "Sigismund" and John cannot yet say that name, he cannot be expected to say, "Hello, Sigismund," the next time the two meet. A thoughtful teacher would not expect any pupil to respond to a situation by making a response that is beyond his current abilities.

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[3] Chapters 14 to 21 of this book are designed to be especially helpful regarding these matters. The following books are recommended as further sources: M. I. Rasey, *This Is Teaching* (New York: Harper & Brothers, 1950); and J. L. Mursell, *Developmental Teaching* (New York: McGraw-Hill Book Company, Inc., 1949).

By studying a child carefully an observant teacher can learn just what responses he can make and just what situations he can recognize. By acquiring such precise understandings of each child a teacher can avoid asking him to do something that is impossible or for which he is not yet ready. Practice in recognizing a situation or in making a response may be necessary before guiding the child into a situation in which he could learn to make that response to that situation.

When an individual makes the appropriate response to a situation and promptly feels a glow of satisfaction in having achieved a result he desired, learning takes place. The tendency to make that same response to that particular situation grows stronger. The most important factor in each instance of learning is the feeling of satisfaction felt by the learner as a consequence of his having achieved a desired result, solved a problem, met a need, satisfied a curiosity, or relieved a tension. The amount of learning (increase in the tendency to make that response when that situation appears again) depends greatly upon the strength of the feeling of satisfaction felt by the learner in his achievement. The mere making of the right response to a situation, without feeling any satisfaction with regard to it, does not strengthen the tendency to make that response when the situation appears again.

Since the feeling of personal satisfaction following an individual's successful response is so important in strengthening his tendency to make that response to the situation again, a teacher needs to be as certain as possible beforehand that the student will feel real satisfaction when he has made the appropriate response. An observant teacher becomes so thoroughly familiar with a pupil's interests, sensitivities, abilities, purposes, and attitudes that he can usually recognize the "psychological moment" when making an appropriate response to a situation would provide the child with strong feelings of satisfaction in his achievement. If a teacher is also sure that the child would value his approval, he can even reinforce the satisfaction felt in his success by giving him a friendly nod, a smile, or a word of commendation.

Each individual learns as a result of his own efforts and successes. No teacher can learn anything for him. The teacher's task is to understand and encourage the individual, to watch for a "psychological moment" when he has a high degree of readiness to learn a specific response, to guide him into the making of the response, and then to reinforce his natural satisfaction in his own success. A teacher can be sure of an individual's "readiness to learn" only by knowing that he has a strong purpose or feeling of need that would be satisfied by making the response to the situation, and by knowing that he can recognize the situation and can make the appropriate response. When the learner has reached this moment of readiness, the teacher can provide sympathetic encouragement and guidance, but the learner himself must make the response to the situation and feel personal satisfaction from his achievement. A stronger tendency to make that same response the next time that situation arises will be evidence that learning has occurred.

Children naturally like to "try themselves out," to explore their environments, and to learn. Any individual who is deeply worried about some problem that seems extremely important to him is not likely, however, to give much time and attention to something that does not appear to offer him any help in solving his own problem. The urgency of his own problem will not be reduced by hearing a teacher say, "Now this is something you should learn." It is even possible that such pressure from others may be an important contributing factor in causing the personal problem that is disturbing him.

An artist-teacher develops within himself a kind of "Geiger counter" for detecting a student who is at the moment relatively free from personal tensions and other distractions and reasonably "ready to learn." Such a teacher is ultra-sensitive in recognizing the moment Johnny is in a favorable condition to learn the appropriate response to a situation through enjoying a carefully guided learning experience. He does not try to force the child to grow, for he knows that this would be a waste of time for himself and for the child. At just the right moment, however, he provides the child with friendly encouragement and guidance in an activity in which the child is ready to succeed, to feel satisfaction, and to learn.

A teacher in the schools of a society

Every society or nation seeks to preserve and to strengthen itself, just as every normal person tries to protect and develop himself. One of the most important agencies set up by each civilized nation in its efforts to preserve and improve itself is a system of education. The schools of a society are established to help its young people to understand that society's beliefs, ways of life, and values, and to prepare them to take a constructive part in its activities and further development. The organization, programs, and procedures adopted for a school grow out of the purposes and beliefs held by those members of the society who were responsible for its establishment and operation. As soon as an institution appears to be meeting the needs it was established to serve, people are inclined to turn their attention and thought to other problems. After an agency has been serving a particular set of needs in a society for a few generations, the citizens have a tendency to expect that agency to continue to serve those needs in those same ways. This tendency explains in part why schools and colleges are often so slow to change their programs and procedures to meet new conditions and needs.[4]

In an authoritarian society, where all important policies are made by a few persons, the schools are organized and operated in those ways which the dictators believe will be most effective in preserving and strengthening their own authority. What shall be taught, how it shall be taught, by whom and to whom it shall be taught, and all other matters are decided by that individual or small group of persons who happen at the moment to be in power.

In the United States, on the other hand, each state developed its own public schools. Each community was directed by its state government to select a number of local citizens to serve on its local board of education, which was then empowered to establish public schools and to determine their policies. The public schools were thus made responsive to the needs for education felt by the local citizens in each community.

With the later growth of these communities, the building of better roads, and the resulting increase in the movements of people from one locality to another, people began to see and to want better educational opportunities than were available in their own schools. By their own decisions, expressed in free elections, the people began to consolidate small school districts into larger districts that could support better schools. Since some communities were financially unable to provide as good schools as they needed, many of the states set up special funds from which local school boards with limited resources might obtain special help. For the protection of all their children, the states began to establish minimum standards for such things as health and safety in school buildings and the qualifications of teachers. What the public schools shall teach and how it shall be taught are even yet, however, and should probably continue to be, primarily the responsibility of the people in local communities and states rather than of national officials.

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[4] The reader who desires to examine more fully the place of public schools and teachers in a free democratic society will find a classic philosophical statement in J. Dewey, *Democracy and Education* (New York: The Macmillan Company, 1923); and a practical recent discussion in R. H. Mathewson, *A Strategy for American Education* (New York: Harper & Brothers, 1957).

The schools of a free democratic society differ from those of an authoritarian society chiefly because of basic differences in beliefs about people and their relationships to each other and to their governments. Where individual human beings are considered as relatively unimportant and irresponsible, a primary purpose of education is to develop citizens who will accept those places in the society to which they may be assigned. Where individuals are considered important and capable of assuming real responsibility for their own self-direction and control, however, a primary purpose of education is to free individuals from the limitations that result from ignorance, misunderstanding, and lack of skills, so that they can all work together effectively in improving the social, economic, and governmental agencies that have developed to serve their common needs. No government, economic system, or social agency is ever so perfect that it could not be improved, but in an authoritarian society the schools are used to prevent rather than to help young people to do their own thinking about possibilities of finding better solutions for the complex and changing problems of living together effectively.

One of the agencies in any country that is constantly in need of improvements is its system of public education. Although every citizen should be invited to participate in planning these improvements, teachers have a special obligation to think clearly and creatively in this field. Nothing about the schools should ever be thought of as so efficient that it might not be improved. Teachers should understand that every feature of the school's organization and program was developed by people in response to the needs that they felt at the time and that it is in no way sacred or unchangeable. A particular school procedure may have been more effective at the time it was adopted than the one that had been used previously, but it may now be far less effective than some other that could be devised. Schools and teachers should constantly be studying their own procedures to determine the extent to which each of them now facilitates or interferes with the effective development of their students.

Although each teacher should seek constantly to improve his own understandings of his individual pupils and their needs, and his own skills in stimulating and guiding each student to the realization of his potentials, he must also bear in mind that he is employed as a member of a school team. No teacher can do just as he pleases at any moment. He may sometimes feel strongly that some procedure required by a policy of the board of education is detrimental to maximum learning opportunities for students, but as long as he is employed by a school board which maintains that policy he should, as a member of the school's faculty, conform to the policy. This does not mean that he should not plan and work in democratic ways for changes in the policy. He can seek in reports of educational research and experimentation for valid evidences of the educational effects of the policy, he can plan and carry out studies of its effects on his own students, and he can then bring the evidences he has collected to the attention of his principal and his fellow teachers, whether the results of his studies support his earlier judgments of the policy or not.

Voluntary professional organizations of teachers are having a constantly increasing influence in the improvement of educational programs and practices. Every teacher should plan to become an active member of one or more of these professional groups. In their meetings and publications he will find a wealth of suggestions which he can use in improving his own understanding and instructional practices. Although the citizens of a community are ultimately responsible through their boards of education and legislatures for determining the general school policies, teachers and their professional organizations can and should provide the accurate information and technical skills needed in evaluating the results being obtained in the schools and in planning for the development of still more effective school programs and practices.

A teacher in the schools of a free society has a tremendous load of responsibility. The public school is the chief agency through which citizens expect their community to be supplied continuously with competent young citizens who will help to preserve and to develop their plans and cooperative arrangements for better living. Every teacher in a democratic society has the obligation to try to develop the capacity and desire of each student, not only to be a productive self-supporting citizen, but to contribute in every way he can to cooperative efforts to discover more effective solutions to the increasingly complex problems of modern life. The artist-teacher accepts this as a challenge worthy of the best efforts he can give, and one that will require him to continue to study and learn as long as he continues to teach.

Learning to work with other people

A human infant is entirely dependent upon other people for the necessities and comforts of life. He learns quickly that people are important to him, especially those who are in the same household with him. The family is normally the first social unit of which he becomes conscious, and the ways in which the members of this first society behave toward him and the feelings developed in him by their behavior tend to affect his social and emotional development for as long as he lives. If his experiences in infancy lead him to feel that he is accepted and loved as an important member of the family, he can feel sufficiently secure and have enough self-confidence to explore the possibilities of relations with other persons. On the other hand, if his experiences in the family lead him to feel that he is not really wanted, he is likely to feel so insecure and uncertain of himself that he will not have sufficient courage to try to develop social and emotional relationships with other persons and groups.

The first persons outside the family about whom the typical child becomes curious are those who appear to him to be most like himself—about his own size. What he learns from each new experience with people will be only an outgrowth of what he has already learned from previous experiences. The nature and direction of his development will always be determined by the interpretations he is able at the time to make of the meanings of his experiences with reference to his own needs and satisfactions. Play groups are normally the first "societies" outside his family of which a child becomes an accepted member.

If a child has developed in a home where the interests and desires of all members are treated as worthy of consideration, he will expect to give consideration to the desires of the other members of the new group he has joined. On the other hand, if his home experiences have been dominated by the demands of one member of the family, he may try to acquire the self-esteem he has been unable to secure at home by attempting to dominate the members of the new group. The results of such early attempts to control others are likely to develop in him tendencies to become either a bully or a docile follower, depending on how he is able to interpret the results of his efforts.

The feelings produced by these first preschool experiences with individuals and groups outside his home exert strong influences in determining the directions of a child's social and emotional growth. A teacher should try to understand not only the directions of a child's past growth but also the personal needs he had felt and tried to satisfy by growing in his particular directions. A resourceful teacher who understands a child's strong feelings of need can usually help to provide him with wholesome opportunities through which he can begin to satisfy his needs in socially desirable and productive ways. On the other hand, a teacher who does not understand the needs felt by a child may, without being aware of the unfortunate effects he may have on the direction of the child's growth, initiate an activity that may contribute substantially to the development in him of feelings of frustration and resentment that may do serious damage.

An individual's present concept of himself and of his relationships with other people is the only base from which he can grow in his social relations, and the only directions his growth can take are the directions that seem to him to promise to meet the needs he feels. An artist-teacher can usually discover the needs each child feels most deeply and can guide him in experiences that will help him to grow in socially desirable directions through satisfying his own needs. The process of social and emotional development begins in childhood, but it continues throughout life, whether a teacher is present or not.[5]

The normal pattern of an individual's development is in the direction of ever-widening circles of social relationships: home, play groups, kindergarten, school, community, and so on. At each stage he normally learns to understand more fully that other individuals may not want exactly the same things he wants, and that in order to be fully accepted as a member of a particular group he may have to modify or even give up temporarily the satisfaction of a few of the needs he feels. This will require frequently that he decide whether his need to belong to the group, and in this way to satisfy those needs that can only be met through such membership, is more important to him than the other more individual needs he would have to neglect in order to be accepted by the group. If he wants to see a particular television program at five o'clock in the afternoon, for example, whereas the other members of his family want to go to the park for a picnic, he will have to weigh the values to himself of seeing the program or sharing in the family picnic.

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[5] The student who is interested in further study of the effects of an individual's feelings upon his social development will find helpful materials in D. Snygg and A. W. Combs, *Individual Behavior* (New York: Harper & Brothers, 1949); and D. A. Prescott, *The Child in the Educative Process* (New York: McGraw-Hill Book Company, Inc., 1957).

As a child grows older he normally identifies himself with larger groups of people. He begins to feel pride in his class at school, for example, and still later in the entire school. If he is selected to represent his class in the student council, to act in a school play, or to serve the school in some other way, his identification with the larger school society is likely to develop rapidly, even though his loyalty to his own class or to his family need not grow less. If a child's need to feel accepted and important in his family has not been adequately met, it is possible that he may even begin to feel an identification and satisfaction in his class or school that will compensate partially for the poor start at home. The chances are great, however, that deep feelings of insecurity in an earlier social group will weaken his capacity to identify himself easily and effectively with later and larger groups.

The social attitudes and habits developed in one's home, school, and community are the only roots out of which one's later attitudes and behavior toward his state, his nation, and his world can grow. A person's scale of relative value for different types of social behavior developed in his early years can often be modified to some extent through thoughtful reconsideration of the real significance of his past experiences, but the conditions that make such reconsiderations possible are much too infrequently provided.

One's natural tendency is to protect and defend the understandings and values he has already developed and used satisfactorily, especially when someone else seems to be threatening or attacking them. The strong emotion naturally aroused by what appears to be an attack from outside blinds a person to the possibility that he may need to reexamine his own concepts and conclusions. What one sees as a personal threat or attack naturally leads him to defense. Nevertheless, a friendly question or comment from a person in whom one has full confidence, and who does not in his mind represent a threat to his own integrity, may sometimes challenge a person to reconsider his earlier interpretations of events and experiences. An artist-teacher, without becoming a threat to the student's concept of his own integrity, can often stimulate and guide him into making thoughtful reappraisals of his own experiences and conclusions.

An individual who has developed normally through mutually helpful relations with other people and groups is likely to feel and to behave quite differently from the way he would if he had grown up in a strong authoritarian culture. He can be expected to believe in himself, but to be willing to listen thoughtfully to the ideas of other people. He will have come to realize that, whenever he joins a group organized for the purpose of achieving an important goal that they all deeply desire, other members of that group may have little or no interest in certain other goals that he has. He will understand that in working effectively toward their great common goal it is advisable for him to defer his efforts to achieve some of his own special goals. He will have learned to look beyond currently obvious needs and conditions and to consider possible future conditions that might readily develop. An artist-teacher, through skillful observation and guidance of his students, can contribute tremendously to the development of such socially mature citizens.

Teaching traditional school subjects

We who teach today do not and cannot know all the important problems for which our students will need to develop solutions. We cannot possibly teach them the answers to their future problems, but we can and must develop their capacities to recognize vital problems, to face their problems with confidence, skill, and creative imagination, and together to work out cooperatively such solutions as will serve effectively the needs of all under the conditions that may exist in their time.

Since we do not know exactly what the vital problems of the future will be, we cannot know just what specialized skills and understandings may be needed in solving them. We can be confident, however, that when the solution of a common problem depends upon a deep understanding of some specific phenomenon or area of knowledge, the welfare of all will be served by those individuals who have developed the greatest skills and the deepest understandings in that special field, provided they have also learned to contribute their special knowledge and skills to the cooperative solution of vital problems in their communities. Each child's unique interests and curiosities should therefore be detected, encouraged, and facilitated, rather than overlooked or repressed by his teachers.

Regardless, however, of the tremendous importance of discovering, encouraging, and fostering the unique interests and abilities of each individual student, teachers are properly expected to help their students to learn certain traditional school subjects. Many parents would be greatly worried, for example, if their seven-year-old child were not being taught to read. A teacher of second-grade children is usually expected to see that they learn to write their names and certain other things. As children grow older they are expected to learn to spell more difficult words, to read longer sentences, and to solve more complex problems in arithmetic. In the upper grades of most elementary schools, the school day is divided into separate periods, each devoted to the teaching of a different school subject In high schools, each teacher is usually assigned to teach a particular subject or group of related subjects—English, mathematics, science, and the like.

There were valid reasons for the development of these traditional patterns of school organization and practice. There are reasons why they cannot be changed rapidly. Until there are enough highly competent teachers, for example, and enough money available to pay their salaries, most of the teachers in our public schools each year will have to carry a heavy responsibility for the learning activities and progress of thirty or more students. In spite of scientific evidences of failure in past attempts to group students in classes by such devices that all the students in a class would have the same abilities, most schools will continue to try to group them in that way. Teachers will continue to be expected to teach students in classes in the different school subjects. Nevertheless, an artist-teacher who sincerely desires to help each student to learn those things that will enable him to earn maximum personal success and satisfaction from his contributions to democratic society will not become frustrated by these requirements of practical school life. He will accept them as a real challenge to his intelligence, scholarship, professional skills, and creative capacities.

Whatever a child's special gifts, interests, or personal needs may be, he will inevitably feel frequent needs to communicate effectively with the persons around him. He will need to learn to speak, to listen, to write, and to read in order to make the most satisfying uses of his unique abilities, and in order to participate effectively in his community. A most significant part of the teacher's task is to help each child to understand this need and to inspire and guide him to want to communicate effectively with his fellows. It is also the teacher's task to observe the individual's efforts carefully and, as soon as he has developed a sufficient readiness to learn a particular response or skill in communication, to guide him in significant experiences that will provide him with real satisfactions resulting from his success in learning it. A resourceful teacher can do this for an individual learner whether there are ten in the class or thirty, whether the class period is supposed to be devoted to reading or to history, and whether the student is in the third grade or in a high-school class. The best time to help a student to learn any item of subject matter is the moment when he feels a real need for it in order to accomplish a purpose that is important to him.[6]

An extraordinary amount of research has been done on the teaching of reading, writing, spelling, and the other language arts. As a consequence, many specialized devices, materials, and procedures have been developed for helping individuals who have special needs or difficulties at various stages in their growth in communication skills. Anyone who plans to be an elementary-school teacher or a teacher of English should examine and learn to use many of these aids. In general, however, each of them is designed to provide the teacher with special help in performing particular parts of his normal instructional task. One device may help in determining the particular situations a learner can recognize, and another in discovering the specific responses he is able to make. One may help in identifying the vital interests and purposes he has that are sufficiently strong to be used effectively as motive power. Others may provide new or review experiences that are within the interests and capacities of the learner, that will help him to enjoy real success and satisfaction and thereby build his confidence in himself as a worth-while member of his group. Materials of comparable types have been developed to aid teachers in various phases of their work in other school subjects. A teacher who desires to become a real artist in the guidance of learning will study the usefulness of these aids, materials, devices, and suggestions, but he will use only those that are appropriate to the current needs of his own individual students.

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[6] Although other chapters in this book, especially Chapters 15, 18, and 20, will provide more detailed discussions of the procedures involved in guiding the learning experiences of individuals, other books should be consulted for more specific suggestions. For help in teaching the skills and understandings needed in effective communication, for example, vols. II and III of the reports of The Commission on the English Curriculum (of the National Council of Teachers of English) are especially recommended. These books are rich in their suggestions for classroom activities: *Language Arts for Today's Children* (New York: Appleton-Century-Crofts, Inc., 1954); and *The English Language Arts in the Secondary School* (New York: Appleton-Century-Crofts, Inc., 1956).

When a number of pupils are ready at the same time to learn to make a particular response to a situation, their teacher may guide them through an appropriate learning experience as a group. When it appears that some activity would challenge the interest and efforts of all members of a class, a teacher can assist them in planning it so that each member will be able to perform his part with success, satisfaction, and consequent useful learnings. Perhaps no two participants in a class activity will learn exactly the same things, but each should be helped to feel a glow of pride in the quality of his own contributions to the group enterprise, and each should be helped to learn from the experience things that are of value to him.

The "subjects" traditionally taught in schools are important. They should be taught effectively. They should be well learned by each student. To be well learned, however, they must be learned by each individual as means for the achievement of purposes that are important to him. It is almost impossible for one to learn a thing that is of no interest to him and in which he can see no real value or use. An effective teacher, therefore, tries constantly to understand the individual student's interests, purposes, and needs, and to use these as the major sources of motivation and of satisfactions in his learning. The amount of time a teacher may spend in helping a student to feel real needs for knowing a fact or for acquiring a specific skill will often save many times that amount in the student's learning of it. An individual normally learns what he feels he needs to learn at once, rather than what the curriculum or the teacher says he should learn for some indefinite time in the future.

The keys to effective learning are to be found in the learner's own purposes and feelings of need. When an observant teacher has discovered these keys, he is prepared to unlock the doors of learning in any direction that the learner can see as significant for the satisfaction of his own purposes and needs. If an individual can be led to see its importance for the accomplishment of his own ends, he will even be eager to drill himself on multiplication combinations, the spelling of words he often needs to write, and the like. A teacher who has not discovered the keys to an individual's efforts is likely to encounter great difficulties in guiding his learning activities in some of the traditional school subjects.

Summary

Learning is a natural process of growth. The directions in which growth takes place are determined chiefly by the interests, curiosities, and needs felt by the individual. The amount of growth that occurs in a person through participation in a particular experience is limited by the meanings and relationships he is able to see between that experience and the needs he feels at that time. Whatever a teacher may do that stimulates or strengthens an individual's interests and curiosities, guides his experiences in ways that enable him to relate them to the interests and needs he feels, or reinforces his feelings of satisfaction in the recognition of these meaningful relationships is a part of teaching.

An effective teacher is an artist at recognizing the need being felt by an individual at the moment and guiding him into an experience that will enable him to perceive the significance of that experience to the need he feels. The growth or learning that occurs in an [illegible] through an experience starts from [illegible] individuals share in a particular [illegible], at school or elsewhere, the growth or learning that occurs in each one is likely to differ from that which occurs in any other, for growth starts in each from a different base and proceeds in directions that are determined by the individual's own current feelings of interest and need.

A society with democratic ideals attempts continuously to improve its programs and agencies for serving the common welfare of all citizens. It attempts to insure these improvements chiefly by establishing schools through which the socially acceptable interests and needs that each youth feels may be discovered and cultivated. It seeks through education to develop in each young citizen a strong feeling of need and responsibility for contributing his special abilities and understandings to the cooperative development of better solutions to the increasingly complex problems of modern living.

The encouragement and guidance of individuals in experiences which enable them to develop in directions that satisfy their own feelings of need, and which at the same time give them real satisfaction in cooperating with fellow citizens in meeting common needs, is the great challenge and opportunity of the teacher. Although success in teaching is facilitated by scientific knowledge of human nature and of the conditions under which individuals grow and learn, an effective teacher is primarily an artist rather than a scientist. He is original and creative in discovering ways to help each individual to develop his own potentialities for living a life that is both satisfying to himself and useful to his fellow men.

QUESTIONS AND EXERCISES

for discussion and study

1 As you look back over your own school and college experiences, can you remember the teachers under whose guidance you and your fellow students seemed to learn most? In what ways did these teachers behave that were different from the behavior of the other teachers?

2 Think carefully about the two persons you know who seem to be most alike. In what ways are they most different? Which do you like better? Why?

3 Try to imagine a community in which everyone looked alike, thought [illegible] to do exactly the same things, and avoided doing any-

4 What is probably the chief [illegible] there be to living in such a ing American colleges today are on an average [illegible] than those who were entering colleges forty years ago? To what extent is this a result of someone having learned something?

5 Have you learned to recognize the differences between the leaves of *Quercus alba* and *Quercus rubra*? If so, what were the needs that led you to make this differentiation? If you have never felt any need to learn this difference, can you explain why? When was the last time you felt a need to learn something more about trees?

6 Recall to your mind an experience in which you learned something entirely different from the thing your teacher expected you to learn. Can you explain why you learned what you did? Why did you not learn what your teacher intended you to learn?

7 One of the most important problems every young person faces is that of choosing an occupation. In what high-school or college department should a person take courses in order to receive help in solving this problem intelligently? Was your present solution of this problem developed through taking a course in that department?

8 Can you think of some person you have known for a long time whose attitudes and behaviors are different now from what they were ten years ago? Can you explain the kinds of things that may have occurred to cause these changes?

9 Is there any teacher to whom you would feel free to go for help in working out a serious personal problem? Is there one to whom you would never think of going for such help? What differences in their behaviors make you feel differently toward them?

10 Is there some country other than the United States in the welfare of whose people you have an interest? What experiences led you to feel this interest? Does the nature of these experiences suggest any possibilities for extending the interests of Americans in the peoples of other nations?

11 What would be your normal reactions to the ideas presented by someone who called you a liar, a thief, or a fool? How much attention would you be able to give to the value and soundness of his ideas?

12 How can you explain the fact that almost any young person can learn English in the new Russian schools, whereas the Russian language is not now taught in ninety-five per cent of the high schools of this country?

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CHAPTER 3

Guidance: A new dimension of creative teaching

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> Guidance is . . . the high art of helping boys and girls to plan their own actions wisely, in the full light of all the facts that can be mustered about themselves and the world in which they will live and work.
>
> ——EDUCATIONAL POLICIES COMMIITTEE

THE DUTIES of a teacher in the colonial times of 1661 are described in the Town Book of a certain New England village. He was to act as court messenger, serve summonses, conduct ceremonial services of the church, lead the church choir, ring the bell for public worship, dig the graves, take charge of the school, and perform other occasional duties. Quaint as this bit of history may seem today, we can read between the lines of this old Town Book that the elders of the village recognized the importance of a teacher and his work. They desired an able and willing person on whom they could rely to assist in meeting certain individual and collective human problems that were constantly arising in their community life. In a spirit of sustained cooperative endeavor, the climate of guidance, they sought a teacher, who was capable and willing to do his part. Today in communities all over our nation we find the same desire to secure efficient teachers so that our children may be competently guided. Guidance is the new dimension of creative teaching.

What guidance is and should do

In the course of their progress toward maturity, growing persons need help in learning to adjust to themselves, to other people, and to changing circumstances. Some need much help; others relatively little. A few need continuous assistance; others require occasional help only. The kind as well as the amount of help needed varies with individual needs and the conditions under which they occur. Guidance may be regarded as the process of providing this help.

Good adjustment to self means being in harmony or getting along well with oneself. It implies a large degree of freedom from depression, irrational fears, feelings of insecurity, unresolved hostilities, and similar handicaps that plague the poorly self-adjusted person, keep him off balance enough to make him feel miserable, interfere with his work, and produce strained relationships with his family and friends. Good adjustment to others involves a cheerful willingness and competence to hold one's own in the give-and-take associations with one's fellows in everyday life. The individual well adjusted to circumstance meets the joys and sorrows of life with realistic and emotionally appropriate attitudes. He has an adequate sense of values characteristic of normal people.

What is guidance to accomplish? Our task as teachers is to help the individual learner to discover his unique personal resources, to develop them properly, and to use them wisely in the pursuit of goals that are satisfying to him and constructive for society. Obviously, numerous practical difficulties may stand in the way: Human beings are of diverse endowments, and the patterns of living are infinitely complex and ever changing. There is no reason, however, to be discouraged by the immensity of the task. Scientific methods painstakingly applied to developing the concept of guidance have been so richly productive that it is not inappropriate to refer to guidance in a broad sense as a new dimension of creative teaching. guid-

The immediate and practical question is: "H can be broken down
ance most useful and productive?"
into several gen function of guidance? "Individuals emerge in theory," Wood and Haefner[1] have pointed out, "and disappear in practice."

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[1] B. D. Wood and R. Haefner, *Measuring and Guiding Individual Growth* (New York: Silver Burdett Company, 1948), pp. 3, 33.

The personal welfare of the pupil is too important to be left to chance. Guidance means aid in helping the child maintain a normal relationship between his abilities and the demands of his environment with proper emphasis upon maturation of capacities for socialized self-direction. Guidance is planned and organized action that aims to provide many of the individual and group experiences that pupils require for growing up. In brief, the function of guidance is to give help when, where, and to whom help is needed.

What kind of help does the individual need? The uniqueness of the individual implies a need for personalized assistance. The nature of this assistance depends upon how well the individual student's needs have been correctly identified and interpreted. We must devise more refined diagnostic procedures for determining the unfulfilled needs in which the developmental difficulties of the individual have their origin. Guidance has a positive interest in both preventive and remedial assistance.

How much guidance should be given? "In our present state of knowledge," Wickens and Meyer[2] have observed, "we cannot state with precision how much or how little guidance should be given in the social and intellectual learning of children; we can only point out to parents the dangers involved in the extremes of too much and too little." The amount as well as the kind of guidance must be determined in dealing with behavioral trends.

What resources are available for guidance services? The effectiveness of our guidance services depends upon the number, kind, quality, and availability of the resources at our disposal. Some environments are much richer in resources than others. To make guidance function at its best, we need to explore, develop, and utilize all resources to which we have access.

What schools should be concerned with guidance? Guidance is for all schools, large and small. Small schools, as Froelich[3] has shown, can capitalize on the advantage their smallness gives them. In a small school, teachers get to know the students well, and students get to know their teachers well. The small school is usually a center of community activities. The youthfulness of many teachers [illegible] small schools suggests a greater adaptability to various guidance duties than older teachers as a group tend to show. Finally, the student population in small schools is relatively stable. Thus, in the last thirty years, effective guidance programs have been demonstrated in many small schools. Froelich has made it quite clear that the difference between guidance service in a small school and the large school lies not in the *quality* but in the *methods* of guidance. Many small schools are adding teacher-counselor positions that combine teaching and counseling duties.

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[2] D. D. Wickens and D. R. Meyer, *Psychology* (New York: The Dryden Press, 1955).

[3] C. P. Froelich, *Guidance Services in Smaller Schools* (New York: McGraw-Hill Book Company, Inc., 1950).

Is guidance for all or for a few? In the mind of the layman, guidance is often identified with remedial or corrective procedures only. Laymen have a tendency to think guidance is only for those whose behavior indicates unsatisfied personal needs, that is, people with mental conflicts, low IQ's, emotional instability, fears, abnormal aggressiveness, insecurity feelings, social handicaps, and the like. But guidance is a service for all, not for the few.

Who should give guidance? A well-trained counselor, as Berdie[4] has indicated, is more than a therapist, who limits his services to people in trouble. On the positive side, there are no limits to the influence for good a guidance-minded teacher can exercise in enriching the lives of all young people. Through his appreciation of life's values, his many opportunities to help the students make increasingly discriminative choices of significant goals, and his specialized knowledge, a superior teacher can exert an influence that will extend beyond the formative period in his students' lives. Moreover, the superior teacher, in his own person, exemplifies to a large degree wholesome patterns of life-adjustment. As part of his immediate duties, the counselor-teacher [illegible] individual busy at his highest level of creativity and [illegible] aids him to become happier, more succ[illegible] useful, and better.

Guidance: keystone of the school program

This chapter is intended mainly for those who have chosen careers in the teaching profession. The general aim is to provide an orientation toward pupil personnel work on the elementary and high-school levels. Its immediate purpose is to suggest practical ways for teachers to enhance their usefulness and feeling of worth through the use of guidance techniques.

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[4] R. F. Berdie, "Counseling—An Educational Technique," *The Education Digest*, XV, No. 1 (Sept., 1949), 4-5.

"Teachers in the classroom," Blair, Jones, and Simpson [5] have noted, "will always have to carry the brunt of the counseling and guidance work regardless of whether a specialist is or is not available."

The expression "classroom teacher" is, in some respects, unfortunate. It easily brings to mind the stereotyped individual with interests, activities, and influence that begin and end within the four walls of a conventional classroom. A fresh verbal symbol is needed, namely, one that connotes something better than stereotyped thinking and institutional rigidity. A word is needed that focuses attention on a creative personality with qualities of dynamic leadership.

We might also do well to re-examine what we mean when we speak of teaching as a profession. The late Louis D. Brandeis, Justice of the United States Supreme Court, wrote, "The peculiar characteristics of a profession as distinguished from other occupations, I take to be these: First, a profession is an occupation for which the necessary preliminary training is intellectual in character, involving knowledge and to some extent learning as distinguished from mere skill; second, it is an occupation which is pursued largely for others, and not merely for one's self; and, third, it is an occupation in which the amount of financial return is not an accepted measure of success."[6]

Some of the qualities that mark the true professional worker have been described by Leighbody[7] as follows:

> The professional worker does not require close supervision or direction
> The professional worker does not regard himself as an [illegible]our.
> The professional worker does not work [illegible] [illegible]sibility for the results of his
> The professional worker does [illegible]
> The professional worker continually seeks self-improvement.
> The professional worker contributes to the skill and knowledge of his profession.
> The professional worker respects the confidence of others.
> The professional worker is loyal to his fellow workers.
> The professional worker avoids rumors and hearsay.

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[5] G. M. Blair, R. S. Jones, and R. H. Simpson, *Educational Psychology* (New York, The Macmillan Company, 1954), p. 391.

[6] *Alabama School Journal*, LXI, No. 7 (Mar., 1944), 7; see also L. D. Brandeis, *Business—A Profession* (Boston: Small, Maynard & Company, 1914), p. 2.

[7] G. B. Leighbody, "What Makes a Professional, Professional?" *The Phi Delta Kappan*, XXXIV, No. 7 (Apr., 1953), 295.

The professional worker adjusts his grievances through proper channels.
The professional worker meets his professional obligations.
The professional worker is sensitive to the problems of his fellow workers.
The professional worker does not advance himself at the expense of others.
The professional worker is proud of his profession.
The professional worker's chief desire is to render service.

Today's teachers are expected to behave professionally. In its modern setting, the concept of guidance adds a new dimension to the professional services of creative classroom teachers. Guidance-minded teachers who cultivate the art of counseling will find their own resources increased and refined. Their work gains in the vitality and depth that mark the true professional servant. Guidance is neither a trade nor a bag of tricks. At its best, it is a professional service.

Guidance concept in school administrative services

The school administrator plays a vital role in establishing the emotional climate and in structuring the educational situations in which teachers work. This role is a complex of many different roles, but multiple roles do not necessarily conflict. How thoroughly the administrator has understood and accepted his general role determines his professional usefulness.

Those who undertake to organize, direct, and supervise programs in education must have special qualities of leadership. Their function, broadly speaking, is to further efficient learning and teaching. They have the responsibility for establishing and maintaining the most favorable working conditions for all. Leaders should know what is expected of them. They should check their results and practice follow-up without conveying the impression of spying. The leader's assignment is to get things done through the efforts of others. How well the school administrator carries out his duties depends upon his ability to work constructively with people, namely, how versatile he is in dealing with the diverse human relations inside and outside the school.

Guidance-minded administrators understand well the value of earning and holding the respect and good will of their co-workers. They realize that their success or failure is determined by the number of people who have confidence in them and their work. The administrator must have at his command suitable techniques of human communication and have insight into their purposes if such techniques are to be used. Staff members do not always understand the variety of interrelated factors that make up the total administrative picture of a school in operation, and it is impractical simply to assume that they do understand. Staff members differ in the amount of empathy they have, as much as they do in numerous other ways.

Often the administrator himself is not certain as to what his teachers really want from their jobs. When this happens, difficulties are created through lack of mutual understanding of a common purpose. Friction is generated and feelings are hurt. Morale is lowered when individuals find themselves working at cross purposes. As a consequence, the administrative supervisor's task of selecting and providing appropriate incentives for bringing out the best in the staff members is magnified. Incentives such as sound and fair promotional policies, genuine recognition of worth, and opportunities for relaxation and recreation lose in attractiveness and pulling power. Time, money, and talent are wasted instead of being employed wisely in advancing the best interests of the students and everyone else. In the words of Franseth,[8] "Leadership is manifested in the attitude that everyone should take part in group actions."

Misunderstandings among people occur when speakers forget that words have meanings only in context and take for granted that words mean the same to everyone. Adequate communication is essential for carrying out guidance services successfully. When communication operates in one direction only, confusion is bound to occur, because any one-way communication system is bound to cause delay, waste, and sometimes failure. Wherever understanding matters, two-way communication is necessary.[9] "If those to whom you talk fail to understand you," Wagner and Arnold [10] remind us, "the fault is yours, not theirs. If you wish to communicate with others, you must do so on their own terms. You must speak the language your listeners understand and speak it in whatever manner their understanding requires."

Two-way communication involves both talking and listening. Listening has been called "the other half of talking." Many have never learned to listen well. They listen in a half-attentive manner called "marginal listening." Again, their listening behavior can be described as "attentive listening," that is, listening in which one hears the words someone else is saying to him, but does not interpret them in terms of his own experience. In a third kind of listening, called "projective listening," the listener tries to comprehend what the speaker's words mean to the speaker himself. This is often rather difficult, especially when one listens to a speaker with whom one disagrees.[11] Projective listening is an art to be cultivated for facilitating communication.

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[8] J. Franseth, "The Function of Leadership in the Elementary School," *The National Elementary Principal,* XXIX (Apr., 1950), 22-24.

[9] M. J. Maloney, "Semantics: The Foundation of All Business Communications," *Advanced Management,* XIX, No. 7 (July, 1954), 27, 126-129.

[10] R. H. Wagner and C. C. Arnold, *Handbook of Group Discussion* (Boston: Houghton Mifflin Company, 1950), p. 139.

Listening tends to be neglected and go unappreciated as a significant form of observation. We have lost the skill to observe, according to Ruesch and Kees[12], and are led astray by verbal language; our need is to cultivate habits of good listening in nonverbal communication. We must learn to listen to more than words; otherwise, verbal listening is insufficient and misleading. Mort and Ross[13] have suggested that "wisdom can be defined as the drawing off of accurate generalizations from experience." From their point of view, we stand to gain both in communication skills and wisdom as we discipline ourselves for efficient verbal and nonverbal listening. Listening techniques employed particularly in nondirective, or client-centered, counseling presume a high order of listening skill.[14]

When we interpret supervision as essentially a guidance process, the meaning and uses of communication as an administrative technique become clear. Supervision is "the prime means of improving people. And people are improved most effectively by a process of *learning*," as Fox, Bish, and Ruffner[15] have expressed it.

Supervision in the past has often been neglected or limited to routine inspection. Frequently, it has been little more than trouble shooting. It is no surprise to find great diversity among the practices employed by administrative supervisors in the effort to improve pupil learning and stimulate teacher growth. Although we should not expect super-

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[11] Maloney, *op. cit.*

[12] J. Ruesch and W. Kees, *Nonverbal Communication* (Berkeley, Cal.: University of California, 1956).

[13] P. R. Mort and D. H. Ross, *Principles of School Administration* (New York: McGraw-Hill Book Company, Inc., 1957).

[14] D. Rogers, *Mental Hygiene in Elementary Education* (Boston: Houghton Mifflin Company, 1957).

[15] J. H. Fox, C. E. Bish, and R. W. Ruffner, *School Administration* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1947), p. 44.

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visory activities to be standardized, a professional obligation exists, nevertheless, for such activities to be efficient.

The acquisition of efficient communication skills, in regard to its value for education leaders, has not been thoroughly studied. The cultivation of such skills is associated with the level of social maturity that engenders a clear sense of direction in the uses of these skills.

The attributes desirable in school administrators are still a controversial subject. At present we lack methods sufficiently precise for use in gathering the information needed to answer questions that arise in regard to what the personality make-up of administrators should be. Burnham[16] many years ago called attention to some factors that retard social growth. A primary factor is our extreme individuality, which expresses itself in various ways. We like to dominate. We dislike for others to tell us what to do and how to do it. We do not readily comprehend views and interests other than our own. In the pursuit of our own interests, we resent interference. We invent subtle ways, individually and collectively, of evading our responsibilities on different levels by putting the blame on someone else. At the same time, we are reluctant to delegate authority to anyone else. We limit the activities and areas in which we accept responsibility to this or that group of our preference, while we pay lip service to democratic citizenship. Few of us know how to conduct ourselves properly in unorganized groups, and we do not know the roles we individually are best fitted to fill in various social groups. If little else, we do know that the ideal school administrator is a socially mature person.

An educational method that is attracting increasing attention is that of group dynamics. The aim of group dynamics is not to develop leaders or discover ways in which an individual may manipulate groups. The purpose is to develop democratic processes. It is based on the assumption that social progress can come only from persons who have learned how to make their most valuable contribution to the welfare of all and are willing to make it. It recognizes that men differ in endowment. One person's special abilities differ quantitatively and qualitatively from those of another. Each member is an active participant; thus the group can do more than individuals can do separately. This helps both group and individual. Segel[17] puts the matter this way: "The process by which one must consider other individuals in a group, and a problem at the same time, not only tends to increase understanding of the problem, but also creates a situation in which the individual has practice in bringing about emotional balance."

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[16] W. H. Burnham, *The Normal Mind* (New York: Appleton-Century-Crofts, Inc., 1924), p. 242.

[17] D. Segel, *Frustration in Adolescent Youth* (Bulletin 1951, No. 1 [Washington, D.C.: Office of Education, Federal Security Agency]), p. 48.

Group dynamics employs techniques designed to reduce interpersonal tensions that would interfere with the best work of the group. Such tensions often arise and threaten the objectivity necessary for a free interchange of ideas bearing on the solution or definition of the problem before the group. When we think alone, we tend to believe our own thinking. When we give voice to our thinking in a group, we are obliged to state the reasons on which our opinions are based. Experience of this kind teaches us what we did not previously know about the other fellow's thinking and his emotional attitudes. We learn also to take more care to think with reference to fact as well as to purpose. This may not be pleasant at first, but the give-and-take is good for us.

In the course of getting to know our fellow group members better, emotions of hostility are resolved. They are replaced by a new and growing respect on our part, and others think more highly of us. In this way, group dynamics helps us learn how to work properly with others in solving problems that face the group. We come to see just how groups can accomplish more than individuals working separately. To achieve this is the purpose of group dynamics.

The implications for guidance are clear. Guidance services in schools are carried out by teachers as individuals and also as group members. The adept administrative supervisor will know how to stimulate individual endeavor and to coordinate the special abilities of his coworkers.

It is to the administrator's advantage not to become so absorbed in the possibilities of group dynamics that he neglects to learn how to deal with individuals. Ideally, an administrative supervisor would be equally skilled in group and individual guidance and counseling.

In working with individual teachers, familiar techniques are classroom visitation, conferences, arranging for teachers to visit other classes, self-ratings on effective teaching, and research projects. Inventive persons modify these and create techniques. Widely used group techniques are teachers' meetings, demonstration teaching, evaluative surveys, workshops, bulletins, and professional libraries. The effectiveness of these varies with conditions. Each has its special purposes as well as advantages and disadvantages. Some are used more often than others, but frequency of use is not the sole criterion of their efficacy as guidance procedures.

The guidance concept places administrative supervision in a fresh perspective and in a realistic context of educational service. It serves to clarify both short- and long-range objectives, and helps to maintain the sense of direction needed to avoid certain hazards that beset administrators. Wrenn[18] has called attention to such hazards, or temptations. They are: (1) to consider programs more important than people; (2) to make quick decisions because of a belief that a good administrator makes quick decisions; (3) to consider group contributions more important than the contributions of individuals; (4) to make decisions to please others at the expense of one's own values and self-respect; (5) to feel that it is a sign of weakness to admit lack of knowledge; (6) to hurry processes and people working toward long range objectives; (7) to talk about democratic policy to subordinates but to follow authoritarian practices; and (8) to excuse one's own blunders by placing the blame on circumstances or on other people.

The administrator is an agent, not a spectator; he cannot himself stand outside the guidance program. For better or for worse, his behavior is a significant and inseparable part of the guidance process. As such, it influences the quality of the guidance services in the school and outside the school.

Making guidance work

The individual teacher asks, "How can I make guidance work? Where do I begin?" Ready-made and final answers cannot be given, but much has been learned about how and where to look for answers.

In the first place, the teacher's initial attitude is important. Many different attitudes are possible. Among them are attitudes more favorable than others to progress in the art and science of counseling.

The guidance *movement* is relatively new in a historical sense. It has the vigor and drama of a new movement, which readily attract enthusiasts. Enthusiastic people have the welcome charm that we associate with energy, drive, and eagerness for action. But *overenthusiasm* is not without certain dangers.

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[18] C. G. Wrenn, "Psychological Temptations of an Administrator," *The Education Digest*, XXIII, No. 7 (Mar., 1958), 12-13.

The overenthusiastic person has a way of letting his emotions interfere with his best judgment. He is inclined to make the snap judgments that people who oversimplify complex problems are prone to make. He expects quick results, and finds it annoying to settle down for a long, hard pull. Before long, his enthusiasm begins to cool. He is disappointed when he finds that he has expected too much too soon. Guidance turns out to be no short cut to progress. It turns out to be no convenient rule of thumb for dealing successfully with the educational processes. The person who is overenthusiastic decides guidance is impractical before he has grasped its underlying concepts and acquired the techniques for translating them into action.

A second type of individual has an initial attitude of suspicion and distrust. He confuses this with critical suspension of judgment. since he is unaware of his own bias. Sometimes he distrusts the methods and the motives of others. This distrust may be of many years' standing. His attitude of suspicion blinds him to almost everything but the mistakes, big and little, made by others. Of course, plenty of such mistakes have been made, but there have also been valuable contributions. He shrugs off or belittles the efforts of others to find better ways of helping children learn. Occasionally, his private feeling is that behind the guidance movement are vested interests, not ideals of service.

The indifferent teacher will have a hard time finding the answer to the question, "How can I make guidance work?" Instead of going out to join others who are searching for more knowledge and better ways and means of improving educational procedures, he is satisfied with things as they are. He is not necessarily hostile. He says, "When you've been in schoolwork as long as I have, you'll not be disturbed very much or very long by every new thing that comes up. There is no need to get excited about guidance just because some other people seem to be. Whatever guidance may be, I'm neither for it nor against it. Live and let live. That's fair enough, isn't it?"

The teacher who is most likely to make some progress in finding out how the concept and techniques of guidance can improve his usefulness has an experimental, or scientific, attitude. This attitude is a primary condition of professional and personal growth. The experimentally minded teacher is not misled by overenthusiasm. He is not inhibited or sidetracked by suspicion and distrust. "It is foolish," he says. "to believe everything you hear, of course. But it is equally absurd for anyone to reject a new idea as nonsense before making a careful investigation of its possibilities. The sensible thing to do is to study the concept of guidance critically and try out ways of translating the concept into action in our work as teachers. Many practical difficulties will no doubt stand in the way. Mistakes will be made and progress will be relatively slow. But progress has been made. Let's find out how to do our present job better, and how to achieve goals that we do not know how to reach at the present time."

Guidance for the elementary-school child

Although there are many practical questions relating to guidance. the following working principles are of considerable importance for the teacher.

Try to give real help. The question, "Do you really want to help?" sounds rhetorical or out of place. The obvious answer seems to be, "Of course, I do!" Yet some soul searching, some investigation of one's own unconscious attitudes, is not without profit. The excuses we make tell much about ourselves. Eginton[19], for instance, has described excuses widely used by teachers: (1) "Pupils are too lazy to work." (2) "Pupils are so stupid that they are unable to do satisfactory schoolwork." (3) "Pupils come from a poor social and economic background." (4) "Parents will not cooperate." (5) "Classes are too large." (6) "Teachers must follow a prescribed course of study." (7) "Teachers must teach the subject matter required by the next higher unit, especially the college."

The intent here is neither to praise nor blame teachers. Few if any of us are in a position to cast the first stone. Nothing is gained when we confine ourselves to argument about guidance in the abstract and ignore the concrete situation in which we work. More to the point is the investigation of living and working conditions that tend to raise or lower teacher morale, and taking active steps to make these more favorable to the progress of both pupil and teacher.

A survey by Hedlund and Brown[20] of 3.000 New York State teachers in 117 representative schools (outside New York City) disclosed that almost nine out of ten teachers were happy in their present positions, and approximately eight out of ten planned to make a career of teaching. However, only a little more than four in ten said they would choose teaching if they could start over, or said that they would not advise promising young people to become teachers.

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[19] D. P. Eginton, "Seven Cardinal Excuses of Teachers," *The League Scrip* (Minneapolis), XIV, No. 2 (Dec., 1933), 31 ff.

[20] P. A. Hedlund and F. S. Brown, "Conditions That Lower Teacher Morale," *The Education Digest,* XVII, No. 5 (Jan., 1953), 14-16.

Hedlund and Brown[21] also found inadequate salaries to be a major factor in causing teacher turnover. Working conditions, too, were major factors damaging to morale. Three out of five teachers said they had too little relief from pupil contact during the day. About one in three said that classes (of 31 to 45 pupils for example) were too large. A major morale killer was the widespread community belief that teachers have easy jobs, short hours, and long vacations. One-third reported that their working conditions did not encourage them to improve their teaching. More than one in three felt that opportunities for advancement were not adequate. Few teachers worried about losing their jobs, but some wanted to change jobs because they did not know "where they stood."

The survey also disclosed that overworked supervisors and administrators neglect to help beginning teachers. The findings indicate clearly that helping beginning teachers with their problems during the first year or two would be of incalculable benefit to their morale. Most teachers reported efforts to develop self-discipline among their pupils, but noted that some children need a degree of close supervision and control that is exhausting.

There is no doubt that much could be done to improve conditions and make teaching more satisfying. The concept of guidance has value to the extent that discerning people translate it into action. With relatively few exceptions, teachers strive to do the best that their working conditions permit. If the potential of teachers is to be realized, however, faulty working conditions must be corrected.

Give help at the right time. Help is sometimes given too early. As long as the child is trying, it is a good general rule to hold help in abeyance. Let him battle when he has a chance to win a victory over circumstances and self. Each victory leaves him stronger for future trials. He gains by acquiring the habit of extending himself to master his school tasks. At the beginning of new learning, he will need much help in order to understand what he is to do and how to go about doing it. He needs the experience of working on his own, for the sake of his growth in self-direction.

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[21] *Ibid.*

Good teachers do not ask the impossible of a child. What they ask may on occasion *seem* impossible to him. He learns by experience that, when a thing seems impossible to do, the truth often is that one has simply not yet found the way to do it. Schoolwork brings many tasks that at first seem too great to the pupil, but it also brings opportunities for the experiences that lead to mastery, provided one applies himself with vigor and intelligence. Nothing is like the thrill pupils experience when their own performance has proved to them that they have learned something they did not believe they could. This is an advance in their quest of identity.

The teacher who has come to value the pupil as a person, and not see him as a statistic, has taken the first long step toward becoming a clear-eyed observer of pupil behavior. The choice of apt teaching procedures depends upon how well we observe pupils in action in their school environment. By continuous and discriminating observation, we collect the pieces that make up the factual picture into which our teaching procedures are to be fitted. Observation is more than simply looking and hearing. To be a good observer one must know what to look and listen for. Giving help at the right time thus depends upon how well the teacher has observed the various manifestations of the trends in the child's adjustive behavior.

The tendency toward premature action can be brought under control when its underlying causes are recognized: (1) *Low frustration tolerance* is one cause. Restless people dislike watching and waiting. They find action much more satisfying; (2) *Weak resistance to social pressure* is another. When others keep asking: "What have you done?" "Aren't you going to do something?" or "What are you waiting for?" individuals feel obliged to do something to relieve this pressure. They allow themselves to be pushed into action aimed primarily at resolving their own tensions rather than helping the child find his normal tensional outlets; (3) *Fears* lead to hasty action. The teacher feels that others will think him incompetent or too timid to accept his responsibility. He feels driven to demonstrate that he gets things done. Again, transient and superficial deviations in children's behavior within the normal range of development arouse his apprehension. He habitually expects the worst to happen. Everywhere about him he believes that he sees signs of underlying behavior trends that should be corrected immediately to avoid serious crises; (4) *Stereotyped thinking* is a condition of hasty action. Rule-of-thumb methods are used by people in matters of a nature that calls for reflective thinking. Individualized assistance to pupils thus becomes mechanical; (5) *Sentimentalism* prompts people to act too quickly. ("I just couldn't sit by and watch the poor little fellow work so hard on that arithmetic!"); (6) *Morbid curiosity* makes it hard for some people to keep from rushing in. ("In the world around us are mysterious and fascinating human beings. What are the real stories of their private lives? What secrets have they? What Freudian mechanisms are at work? Here is my chance to get in some practice on that ink-blot test!")

Help often comes too late to do much, if any, good. Faulty attitudes on the teacher's part contribute to poor timing of help. Excuses such as the following point to faulty attitudes: (1) "*Too Busy.*" In the rush of a crowded day, the individual child is forgotten. His troubles have been accumulating for some time, but the usual storm signals were ignored. It is found too late that, with a little timely help, the child's difficulties could have been reduced, or perhaps, prevented altogether; (2) The "*Muddle Through*" attitude is that things usually work themselves out, if we give them time. After all, troubles are normal throughout all stages of growth. Most of them are imaginary; (3) "*Too Hot to Handle.*" When they think a teacher has overstepped the bounds and gone too far, parents are likely to be up in arms. Children with difficulties of adjustment should be taken to specialists, because few teachers are trained to do more than handle ordinary kinds of remedial work necessary in their classes. It is well not to start something one may not be able to finish; (4) "*No Special Help Is Needed.*" All children have their ups and downs. Coddling is bad. The child has been getting as much help as the rest of the children in his group. He has to learn to solve his own problems, and experience will teach him not to create problems for himself. His home should assume more responsibility; (5) "*I'll Wait until I'm Sure.*" Everybody is giving free and conflicting advice. They say: "It's a sex problem," "His father is an alcoholic." "His IQ is low." "He'll snap out of it." "Send him to the office." "It's the curriculum, not the youngster, that's maladjusted." "I know this child. I was never able to do anything with him." "What does Gesell say to do in a case like this?" "What does Spock say?" "This child just wants attention. He is too lazy to work." "You'd better not experiment. Wait until you're sure!"

Personnel work with high-school students

Throughout infancy our welfare depends upon decisions made by adults. Our food, clothes, medical aid, shelter, routines, and so on, are chosen for us. As we move out of childhood, we are allowed various liberties that are commensurate with our stage of growth. With the approach of adulthood, the freedom to follow our own preferences is vastly extended. In a few more years, freedom from parental control will be complete. In conducting his personal affairs, the young adult has freedom to follow his preferences, as long as his behavior is acceptable to society.

The new freedom to choose turns out to be a mixed blessing. Good judgment tends to be rewarded; for our mistakes in judgment we usually have to pay in one way or another. The problem is how one is to select the most constructive course of action in this or that area of living from the variety of different courses available. The issue to be resolved is this: What consequences are most likely to follow, if I choose to do this? Would it be better to choose to do something else instead? Under ordinary circumstances, many decisions in everyday life are relatively simple to make. With an unusual change in circumstances, however, decisions that normally give us little or no trouble often become most perplexing.

At decision-making the adolescent is hardly a novice. To some extent, he has had childhood experience and training in managing the personal affairs that are characteristic of his age level. For example, under parental or other supervision he has learned something about planning as regards money and its uses, personal property and its care, schoolwork, and so on. He has grown in the realization that decision-making is beset with known and unknown pitfalls. He is eager to learn how to choose wisely and well, but finds it hard to achieve a satisfactory balance between his personal resources and the demands of his environment.

A good counselor will remember that what the individual usually lacks is not the powers to solve his personal problems, but the ability to bring his powers to bear most effectively on the solution of the problems meaningful to him. His powers, or resources, are still developing. How well he has learned to meet difficulties may make or break him, and also cause happiness or unhappiness in the lives of others. This is one of the chief reasons for the supreme importance of decision-making.

Our own ignorance is a common stumbling block, for we could often meet situations better if we knew just a little more. Inadequate emotional control is another handicap. We fail to keep the firm grip on ourselves that we need in order to manage frustrating situations and also ourselves. Impulsiveness on our part and our tendency to follow a line of least resistance create hardships we quite often could have avoided.

Personal problems do not spring up suddenly from nowhere. They usually build up over a period of time, and a number of separate difficulties combine to create a severe major problem. But problems are the order of human life. With foresight and the timely use of preventive measures, many are avoidable. Others can be met successfully, provided we are willing to learn how. For some we can work out compromise solutions. Still others we must learn to endure with such grace and fortitude as we can command.

A truly helpful counselor has talent for entering the adolescent's world. He has the necessary empathy, a condition of rapport, and the power to inspire confidence that enable him to help the adolescent find himself. He is mindful of the limitations of verbal communication as a means of exchanging ideas and expressing feelings, and he is capable of providing appropriate emotional support when and where this is needed.

Personnel work with high-school students deals largely with assisting the individual student in learning to make the decisions successful management of his personal affairs requires. This is largely a communication process. It is not exclusively intellectual, since emotional factors enter into it, as we have seen. Unconscious as well as conscious bias on the part of both teacher and student must be kept under control. This means that both teacher and student must cultivate insight into the defense mechanisms that threaten the achievement of realistic decisions, that is to say, interfere with the employment of objective methods in thinking to some purpose.

In everyday matters, we cannot expect adolescents to govern their decision-making behavior in accordance with the rules of formal logic. There are several reasons for this, as Snygg and Combs[22] have shown. Formal logic is a field that rigidly excludes personal reference and meanings. In formal logic, the individual's phenomenal field is limited to a small number of factors, and these factors must be so clearly differentiated that they can be intelligibly verbalized. It is not possible to reduce a personal problem-situation to a logical proposition without doing violence to details of potential significance for the individual's behavior. Sources of error in the kind of thinking involved in decision-making in matters of everyday life have been described by Guthrie and Edwards[23] as follows: (1) emotionally toned words, (2) failure to consider all the data, (3) the use of unwarranted assumptions, (4) the tendency to be governed by desires, not facts, (5) early indoctrination with beliefs the individual persists in accepting uncritically, (6) the persistent tendency to think in all-or-none terms, and (7) failure to recognize that situations change with time, or trying to meet new situations with old methods.

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[22] D. Snygg and A. W. Combs, *Individual Behavior* (New York: Harper & Brothers, 1949), p. 355.

In this connection, we must remind ourselves that adolescent emotions in some important respects differ from those of children and adults. In adolescence, typically, emotions are intensified, and difficult for the individual to control. They are variable. Young persons find it difficult to acquire control of emotional expression. Moodiness is relatively common. As the adolescent nears maturity in dealing with interpersonal and intrapersonal frustrations, his mastery of emotions increases. The emotional stability necessary for efficient problem-solving behavior improves.

What attitudes do teachers take toward high-school students today? This question is important, for teachers' attitudes influence the kind of personal relationship they establish with their students and produce a wholesome or an unwholesome emotional climate in their classrooms.

Eugene Gilbert,[24] president of the Gilbert Youth Research Company, recently published findings in a survey of four hundred teachers made by his organization. He reports that teachers as a group are not indifferent to student needs, but express a deep interest in student welfare and progress. They are mindful of their professional responsibilities, sensitive to the problems of today's youth, and positive in their attitudes.

Nine out of ten teachers said that available resources are adequate to meet the needs of young people, but six out of ten considered juvenile delinquency to be on the increase. Practically none believed it to be on the decline.

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[23] E. R. Guthrie and A. L. Edwards, *Psychology* (New York: Harper & Brothers, 1949), p. 300.

[24] E. Gilbert, "What Teachers Think About Teen Agers," *The Birmingham Nev* (Alabama), Apr. 10, 1958, p. 69.

The teachers considered the change in home conditions since their own school days to be significant. In their judgment, there is now a lessening of parental controls, less love, and less respect for older people.

The great majority suggested that one way to improve the current situation was for schools to require adolescents to do more thorough work in school, and 85 per cent advocated more homework as a means of encouraging growth in student responsibility. They were quick to emphasize, however, that homework was to be used as a creative activity, not as a form of punishment.

The manners of today's youth seem to be worse, according to 50 per cent of teachers with a minimum of ten years' experience; 34 per cent said manners were much the same; and 16 per cent reported improvement.

Gilbert's study suggests that teachers, as a group, have a serious interest in the progress of their students. They perceive needs for student guidance in certain areas, and are willing to take an active part in suitable guidance programs.

Some 10,000 representative classroom teachers cooperated in a survey of pupil behavior made by the National Education Association in 1956. The findings were both good and bad. The sheer size of the national school system contributes to the behavior difficulties of pupils. There is evidence, however, that big cities and big schools can do much to offset the handicap of size as such. The crux of the problem seems to be the willingness of the community as a whole to cooperate. No convincing evidence was found to support a belief that authority to administer corporal punishment reduces behavior problems, although teacher opinion is divided on this question.[25]

The results of an extensive survey of some 25,000 high-school students have recently been made public by Remmers and Radler.[26] Their minds, bodies, relationships with parents, dating, schoolwork, money, and what to do in life are among the numerous student concerns. Some findings of Remmers and Radler are these: (1) 52 per cent want to gain or lose weight; (2) 37 per cent want to improve posture (or body build, in the case of boys); (3) 54 per cent want to know how to study better; (4) 54 per cent have trouble in concentrating; (5) 41 per cent have trouble expressing themselves in words; (6) 38 per cent have trouble expressing themselves in writing; (7) 56 per cent wonder what kind of work they are best suited for; (8) 42 per cent are not sure of their real interests; (9) 40 per cent wonder how much ability they really have; (10) 33 per cent report nervousness, excitability, feelings of guilt, inability to break bad habits, and feelings of being unsure about themselves; (11) 10 to 18 per cent reported: "Parents don't treat me as a grownup, nag me about studying, interfere with my choice of friends"; (12) 19 per cent said, ". . . afraid to tell my parents where I've done wrong."

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[25] "Teacher Opinion on Pupil Behavior, 1955-1956," *The Education Digest*, XXII, No. 3 (Nov., 1956), 16-19, abstracted from *National Educational Research Bulletin* (National Education Association), XXXIV (Apr., 1956).

[26] H. H. Remmers and D. H. Radler, *The American Teen-Ager* (Indianapolis: Bobbs-Merrill Co., Inc., 1957).

The students' views on school are encouraging: (1) 86 per cent believe that most school courses are practical to give; (2) 14 per cent said that "academic background" is important for the school; and (3) almost 75 per cent of the students reported that "the main thing school should do is to teach you how to get along with people."

To summarize, this section is an attempt to interpret for guidance-minded teachers some selected phases of personnel work in the high school today. The development of meaningful decision-making behavior in the emergent life patterns of adolescents is one of these. The second phase includes consideration of the typically adolescent intellectual and emotional resources in their bearing on the processes of adjustment peculiar to this developmental period. The third phase has reference to the school situation, or educational context, and the complex of forces operative in this context as described by statistics. These are the forces that, in the perspective of the guidance concept, are to be taken into account by teachers in helping young people achieve a degree of expertness in personal decision-making.

Guidance and success in schoolwork

The need for counseling in the elementary and secondary schools has been shown by numerous studies made from time to time. Here we shall review the highlights of one of the most significant of these, namely, the study reported in 1955 by the Curriculum Association, a department of the National Education Association.[27]

The drop-out rate on the secondary-school level is great. Of every hundred boys and girls who enter high school, fifty remain to graduate. Failures and drop-outs can, in many cases, be traced to inadequate guidance in the lower grades, according to Low and associates, where lack of guidance causes unhappiness and emotional stress.

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[27] C. Low *et al.*, *Guidance in the Curriculum*, 1955 Yearbook (Washington, D.C.: Association for Supervision and Curriculum Development, National Education Association), p. 103.

Teachers quite often do not know their pupils, and leave counseling to a guidance specialist, whom they expect to take care of children with difficulties. However, this plan often fails to work out satisfactorily, and the child is sent to the next grade, where his history repeats itself. The result is that, when classroom teaching is separated from guidance, the elementary-school child's unhappy experience leads to his leaving school.

On the high-school level, the unhappy consequences are similar. The Low report takes the position that the teacher's business is to see that his students learn the content of the subject matter he teaches. The guidance counselor's job is to help students choose and enroll in the subjects best suited to their purposes, interests, needs, and capacities.

No outside person can accomplish as much as the guidance-minded teacher, when he is properly qualified to counsel individual boys and girls.

The report emphasizes that classroom teaching and guidance should be inseparable, but it holds that there is a definite place for the specialized guidance worker in the scheme of things. Some aspects of guidance, particularly the therapeutic, call for the use of techniques in which classroom teachers are not trained or for which their schedules allow insufficient time.

The school must be prepared to help parents when parents need guidance. A basic preventive program that Low and associates recommend would start in the child's preschool years, and would provide opportunities for parent education and counseling for parents. A qualified guidance specialist, or a qualified kindergarten teacher, might do this counseling. Since few schools at present can make available guidance services on preschool levels, it would be wise to make guidance available to children in their earliest school years.

Guidance for the exceptional child

At present, about 33,500,000 children are attending school in grades from one through twelve. In this group, approximately 4 million are "exceptional." The committee for the National Society for the Study of Education described exceptional children as "those who deviate from what is supposed to be average in physical, mental, emotional, or social characteristics to such an extent that they require special educational services in order to develop to their maximum capacity." [28]

These children, as Baker [29] has emphasized, are not a class "separate and distinct from normal children." In certain respects, they are far enough below or far enough above the average range to need the specialized attention not provided in the regular classrooms. The basic educational aim of optimum development for these children is the same as that for all children, only the means of education differ. Equality, not identity, of opportunity is the guiding principle.

At the present time only a relatively small number of exceptional children are receiving the special services that they need, such as special instructional techniques, special equipment, school schedules organized to fit their special needs, and teachers with professional qualifications and personal qualities needed for work with such children.

Teachers of exceptional children need some special training and personal qualities beyond those required of regular teachers. They certainly need to have abundant confidence, self-control and self-direction. In dealing with certain types of handicapped children, only patience and perseverance will bring them success. The exceptional child and his education should be viewed as a problem to be solved. An experimental or scientific attitude in dealing with such problems will bear fruit. If certain materials and methods are not productive, others can be tried out. Moreover, all teachers need to keep physically fit and to maintain good mental health or else they are likely to develop faultfinding and over-critical attitudes toward these children.

The nature of the problem of exceptional children and various educational implications are discussed in Chapters 6, 23, and 25.

Specialist in educational guidance: opportunities; requirements

Often individuals who have previously served as classroom teachers have become professionally trained workers in the field of guidance.

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[28] N. B. Henry (ed.), *Education for the Gifted*, Fifty-seventh Yearbook of the National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1958), p. 3.

[29] H. J. Baker, *Introduction to Exceptional Children* (2nd ed.; New York: The Macmillan Company, 1953), p. 11.

Training programs for specialists in guidance have already been developed by a large number of institutions. Still more programs of this kind are now in the planning stages.

As of June, 1957, forty-one states have certification for guidance workers and school psychologists. Certification requirements are reported by the District of Columbia, Hawaii, Puerto Rico, and the Virgin Islands. In thirty-four states certification is mandatory; in seven it is optional. Nine of the forty-one were added in 1956, and others are expected to follow soon. Brewster,[30] who has made available a detailed summary of the various state requirements for certification, reports that these vary from state to state. A survey of the training facilities available for preparing personnel workers at all educational levels, with descriptions of programs in many graduate schools, has been made available by La Barre.[31]

Summary

1. Teachers throughout history have tried to help their pupils learn. The basic purpose of guidance, broadly speaking. is not new. With advances in modern psychology, however, understanding of human developmental processes has been enormously extended. What is new is the application of scientific methods in influencing the course of human growth trends toward a realization of their potentialities.

2. The climate of guidance, the spirit of cooperative endeavor in assisting girls and boys to plan their actions wisely, is a primary condition of successful counseling.

3. Guidance is not a panacea, but a process of helping young persons learn to adjust to self, to others, and to circumstances.

4. Important factors upon which successful guidance depends are: (a) knowing the kind of help the individual child requires, (b) providing as much help as the child needs at a given time, (c) strategic timing of help, (d) the amount and quality of the resources available

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[30] R. E. Brewster, *Guidance Workers Certification Requirements* (Bulletin 1957, No. 22 [Washington, D. C.: Office of Education, U. S. Department of Health, Education and Welfare])

[31] C. La Barre. *Graduate Training for Educational Personnel Work* (American Council on Education Studies, Series VI, Student Personnel Work, No. 11 [Washington. D. C.: American Council on Education, 1948]) ; see also *Educational Research Bulletin*, XXII, 234-239 and XXVIII, Parts One and Two.

for use in providing help, and (e) the qualifications of those who give the help.

5. Guidance, the keystone of the school program, presumes a high degree of professionalism on the part of both administrative officers and members of the teaching faculty.

6. Administrative services as well as classroom teaching must be positively oriented to the guidance concept. Adequate two-way communication is essential to efficient administrative leadership in harmony with this concept.

7. Skill in the use of group dynamics produces effective coordination of group activities in interpreting and translating the guidance concept into action.

8. Popular misconceptions of the nature and functions of guidance tend to produce faulty initial attitudes. Of the various initial attitudes possible for the classroom teacher to assume, the experimental, or scientific attitude, is the most productive.

9. Care should constantly be taken to avoid uncritical acceptance of so-called "common sense" procedures. It is better to investigate the child's unsatisfied needs objectively than to follow the "common sense" of community folklore. Strategic timing of assistance adds to the value of this assistance to the child. Help should be given neither too soon nor too late.

10. An important phase of personnel work with high-school students deals with planning and providing the assistance the individual adolescent needs in learning how to make wise personal decisions in the management of his everyday affairs.

11. The achievement of balance between his personal resources and the demands of his environment is the recurrent adjustive problem the adolescent must solve. The quality of his processes of adjustment is influenced by his decision-making behavior. High-school students need assistance in learning to acquire the techniques employed in making decisions most conducive to their optimum intrapersonal and interpersonal adjustive behavior.

12. Exceptional children deviate from the supposed average to such an extent that they need special help. The educational aims for these children are the aims for all children; the means differ. Equality, not identity, of educational opportunity is the guiding principle.

13. Above and beyond the personal qualifications required of regular teachers, the work of special teachers demands that they (a) be

competent in self-direction, (b) possess patience and perseverance, (c) be experimentally minded, (d) be physically fit, and (e) be well adjusted to self and to others.

14. Training programs for specialists in guidance have been developed by many institutions. More programs are being planned. As of June, 1957, forty-one states had certification for guidance workers and school psychologists.

QUESTIONS AND EXERCISES

for discussion and study

1. Describe several ways in which school-community relations, as you know them, can be improved so that the group endeavor needed in furthering guidance services in elementary and secondary schools will be facilitated.
2. From your personal observations, what individuals need guidance? At what times do they need it? What kinds do they need? What are the minimum resources that must be available for providing guidance? Who is to provide it? By what means is the degree of success in guiding the individual to be appraised?
3. Prepare a paper for class discussion on the theory and techniques of counseling.
4. Describe the tools commonly used by counselors and tell for what each one is used. (Tests, records, and others.)
5. Conduct a panel discussion on the relative merits of directive and non-directive, or client-centered, counseling.
6. Contrast individual guidance with group guidance procedures. State some advantages and disadvantages of each.
7. Show how it is to the advantage of guidance-minded school administrators to be skilled in (a) projective listening, (b) two-way communication techniques, and (c) the applications of group dynamics.
8. What advantage does the teacher have who maintains an objective, or scientific, attitude toward counseling?
9. What school and community conditions tend to cause low morale on the part of teachers and thus handicap the functioning of desirable guidance services?
10. Why is strategic timing of great importance in giving assistance to the individual student? Give as many good reasons as you can.
11. In what areas of school life would you expect elementary-school children to need individual help at various times?

12 In what areas of high-school life would you expect students to require personnel services at various times?

13 What obstacles must adolescents learn to overcome in making personal decisions most favorable to adjustment to themselves, to others, and to circumstances? What kind of emotional support and other assistance would you expect a guidance-minded teacher to be ready to give?

14 What facts have studies of students' success in schoolwork brought to light? What significance would you attach to such facts?

15 What are "exceptional" children? Are the aims and methods of education for these children the same as the aims and methods for children not so classified? Explain in some detail.

16 What qualifications above and beyond those required of regular teachers must special teachers possess in order to succeed in their work with children classified as exceptional?

17 Make arrangements to visit at least one small school and one large school for the purpose of observing how guidance services in these schools are organized and how they operate. Talk to as many individual teachers as you can about the kinds of help they give students in their classes. Ask them for suggestions. Write a summary of your observations for class discussion.

18 In what sense does the classroom teacher who has understood the guidance concept and the practical implications it has for his own work add a new dimension of creativeness to his professional service?

19 Draw up a plan for increasing your personal effectiveness as a creative classroom teacher. List your liabilities and assets, state your aim, define your immediate goals, and describe the methods of reaching your goals. Analyze and appraise the methods of getting action from yourself to carry out this plan.

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II

PERSONALITY AND ADJUSTMENT

CHAPTER 4

A teacher's theory of personality: development, dynamics, ideal

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The idea of the whole person

EACH ONE OF US—STUDENT OR TEACHER—has ideas about personality, about the whole active individual. As we come to know a person, either younger or older than ourselves, we begin to recognize and expect certain characteristic ways of behaving that distinguish this unique individual from all other people. As we observe this particular person over a period of time, we notice how his temperament, interests, and attitudes are developing, and how his behavior tends to take a more or less consistent direction. Just as we begin to assume that we can predict his next action, however, we may be brought up short by an unexpected shift in attitude and behavior. In spite of this apparently sudden shift, we still continue to think of him as a definite personality, while acknowledging we have not fathomed the dynamics of the many forces operating within him and the impact of environmental forces playing upon him. Thus we use the term "personality" somewhat loosely as standing for that degree of consistency in behavior by which we distinguish our acquaintances one from the other.

As teachers responsible for the guidance of youth, we are ever trying to refine and organize our ideas about how the dynamic processes of human development can be built into a sounder and more systematic theory of personality. For we realize that, in education as in other fields, such as the sciences, progress depends upon the formulation of a hypothesis [illegible] theory to guide experimental practice. It happens that in the area of personality study, each of us starts with a more intimate experience and a wider range of pertinent ideas than when we begin study in new fields, such as chemistry or foreign language. Everyone, besides having grown up in close contact with a wide variety of personalities, can truly say, "I am a personality; I am a person; I am a self." So, beginning with random observations of ourselves and other people we can move toward constructing a broader theory of personality through intelligent attention to our daily experiences. In order to fashion such a sensitive and adequate instrument, it may be necessary to eliminate many misleading notions, refine our observations, and relate the various findings of psychology and other disciplines. By such a process we can fashion a personality theory that will be as genuinely our own as the hockey sticks boys make for themselves out of crooked branches of trees. Using a personality theory of our own we can work much more effectively with people, whether they be classmates, pupils, or professional colleagues.

Attention to a learner's whole personality does not necessarily imply that a teacher is taking undue responsibility for social adjustment, emotional stability, or moral character. Certainly, the prime responsibility of the school and the teacher for skills such as reading and writing, for understanding in mathematics, science, and history, for appreciation in the arts, and for other aspects of intellectual development must not be ignored in favor of any ill-defined and superficial hope of producing "pleasing personalities." Nevertheless, no matter how great the concern in a school system with the three R's and other curricular subject matter, a teacher in that system can promote learning in these areas effectively only through an understanding of personality development and its dynamics, for it is the whole individual who is learning or failing to learn.

No school can deal with "minds" exclusively, because the youngsters always bring along to school their physical bodies, their many anxieties and joys, their friendships and their frustrations, not to mention their methods of dealing forthrightly or evasively with people and things.

All these are inseparable aspects of their lives and personalities. Whatever learning occurs in any school depends upon the dynamic relations between the diverse aspects of personality and the activities of study in laboratory and classroom. The effective teacher of a subject or a skill is alert to the psychology of interaction throughout the personality as well as to the processes by which intellectual understanding may be attained in a particular field of study.

Experience of self and others

The origin of our conception of personality in intimate experiences is rooted more deeply than any reading about personality will produce. Nevertheless, if one leans too heavily upon the narrow experience of looking at oneself and of comparing others with himself, he may become a prejudiced rather than an acute, accurate, objective observer of others. To make sound interpretations of behavior requires a broader outlook. The task of formulating a dependable and useful theory of personality development and dynamics involves making one's escape from the limited view given by being a certain kind of self, but all the while retaining that warm appreciation of other persons that comes from being one of them. Since as teachers we deal continually with human beings, we always have the opportunity to combine our scientific theory of personality with a genuine empathic understanding.

Teachers are fortunate, in their opportunities to develop a broad useful understanding of personality, because of the wide variety of selves they meet in their classrooms. Any college student who may not yet be facing a group of diversified learners already has plenty of resources, however, in his past and present contacts. Probably he knows well several elementary-school pupils whose personalities he has seen developing over a period of years. He may have had similarly extended experiences with a few adolescents now in high school. As for persons in his own age group, he is still more apt to be witnessing and perhaps feeling the dynamics of their current interpersonal reactions. Also, the young adult usually maintains some contacts with the more-or-less curious behavior of older persons who belong to the age groups of his parents and grandparents. These personal observations, ranging from infancy to "second childhood," may be rechecked by current studies and systematic review to see how one's ideas about younger people, older people, and those of one's own age group fit together. Such a life-span view of personality provides a helpful setting in guiding development at any age level, including that of the teacher.

In the common current thinking about human beings, taken from the people about one, there are likely to be some misconceptions. Consequently, our study of personality may be quite as much a process of trimming here and there, and of unlearning erroneous notions, as of adding new facts and ideas. As one of the most able students of personality, Gardner Murphy, has said, "Not much, I believe, is known about man [especially about] persons as known to others and to themselves." Thus, Murphy finds himself offering only "an explorer's kit." [1] In like spirit, let us ask of what pitfalls and blind alleys we shall take warning and in what directions can we most profitably inquire.

A preliminary view of learners as persons

As a teacher meets a new class for the first time, several aspects of personality aid in differentiating the students, kindergarten or graduate, from each other and identifying them by name. The teacher so quickly notices the predominance of girls or boys that the contrast between femininity and masculinity can easily slip in, carrying with it concealed assumptions about personality—some sound, some unsound. Then, in trying to relate name to face, the teacher is actually impressed by the whole physique—the short, the tall, the slight, the rugged—along with the closely related degree of awkwardness or dexterity in manual tasks and movement, called "motility." [2] Often temperament will appear early in the teacher's observations: At least the boisterous, the out-going, and the excitable will be noticed, while the alert teacher also picks out before long the quiet ones, who may be timid or apathetic. As the class gets down to school work, the teacher sees signs of brightness in some learners and of lack of understanding in others. Further, certain pupils can be distinguished as having special interests. Thus, the teacher associates the name of each girl and boy with a particular pattern of personality aspects.

This brief listing of important aspects of personality—sex, physique, motility, temperament, intelligence, and interests—has been made from the viewpoint of a teacher's early observations of a class group. This preliminary recognition of personality differences by the teacher is relatively superficial. Beneath the obvious characteristics lies the significance to each learner of his own special interests, intellectual abilities, persisting temperament, physical equipment, and sex identification. The wise teacher seeks not only to appraise these qualities accurately but to answer the question, "How do this learner's strengths and weaknesses make him feel about himself as a person?" Our study of personality development is directed, therefore, toward meeting the teacher's concern with the whole person in facilitating the learning process.

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[1] G. Murphy, *Personality* (New York: Harper & Brothers, 1947), pp. ix-x.

[2] C. E. Skinner, "The Human Personality" (Unpublished lecture, 1958).

The term "personality" as psychological symbol

Our progress toward deeper understanding is likely to be retarded, however, unless we have a clear recognition from the beginning that words like "personality" and "self" do not *explain* development. The word "personality" stands for a general idea, not for a specific force or a particular thing. It is very easy for a person to let keen awareness of a psychological problem be dulled, when he grasps a new term, such as "personality," or employs a familiar word, such as "self," in a technical context. Most of us have grown up among the psychologically unsophisticated, who freely use the word "self" as if it explained selfish behavior, the word "mind" as if it explained rational behavior, and the word "soul" as if it explained good behavior. Consequently, we have to be on our guard lest we unconsciously put a soul within a soul, a self behind a mind, or a personality underneath the complex behavior of an individual. Words carelessly used may obscure rather than explain the factors involved in human action.

Although the light of twentieth-century physiology saves us from the error of the seventeenth-century French thinker, Descartes, in locating the soul or mind in the pineal body amidst brain tissue, we may be confused still by a common human wish for an actual substance at which to point whenever we use a noun.[3] Just as the mumbling of the term "gravity" by a member of a high-school physics class does not prove that he understands the relations of mass and distance involved, so in educational psychology it is safer to think of a term like "self" or "personality" not as a controlling force but as a psychological question mark.

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[3] B. H. Bode, *How We Learn* (Boston: D. C. Heath & Company, 1940), chap. 3.

With all our intimate appreciation of the concrete experiences out of which comes the idea of a "self" within, and with our intellectual recognition of the abstract character, but potential meaningfulness, of the concept "personality," it still may be difficult to preserve consistently the real meaning of this verbal symbol. When the symbol "personality" is treated with the respect due an unsolved problem, however, the way is kept open for further interpretations and for the discovery of explanations that actually deepen understanding. Effective thinking may then be stimulated and extended rather than arrested by the too easy process of mere naming.

Continuity and unity of personality

The justification for using the vague, catch-all word "personality" in a study of educational psychology, which seeks to be scientific in method, lies in the need for a comprehensive term to carry two related concepts, continuity and unity. We mean here by "continuity" that degree of similarity in appearance, speech, and behavior by which we recognize a person whom we have not seen since yesterday, a year ago, or even ten years ago. We mean by "unity" that degree of relatedness by which each voluntary, muscular movement, each physiological change in the digestive, glandular, circulatory, and nervous systems of the body affect each other and the person's behavior, including the complex interactions of emotional, motivational, and intellectual functions. The term "continuity" places emphasis upon development during the passage of time, whereas the term "unity" may help us to think of the dynamic changes occurring at a particular time. Together these verbal symbols serve to call attention to the question of consistency in the behavior of a person.

Since no person is entirely consistent in his behavior from infancy to old age, and since daily we all exhibit inconsistencies in behavior, these characteristics of continuity and unity are matters of degree. They introduce questions of "how much." How much continuity in behavior can the teacher expect of a six-year-old when he has become an adolescent of sixteen? How much unity or integration is there between the in-school and the out-of-school behavior of this elementary-school or high-school pupil? How much consistency does the teacher exhibit throughout his own life?

The pertinency to education of these fundamental questions of continuity and unity, and of consistency, is fairly evident. We teach in order that change, namely, improvement, may occur. We seek no absolute consistency or sameness, but change in the direction of growth and development. Consistent, continuous growth appears to be our educational ideal. Learning by a maturing child is different, however, from the child's own physical growth. The growth of a child is directed through self-regulating, self-balancing processes of the living organism, which physiologists call "homeostasis."[4] Although food to eat, air to breath, opportunity for exercise, and other health-promoting conditions must be provided for the growing animal, the homeostatic processes appear to regulate physical growth in ways not provided in the processes of school learning. Problems of content and method, then, as related to developmental change, continually face those who would guide youth. How can we keep a degree of continuity in the pupil's life that conserves the best factors, and at the same time foster to a liberal degree the acquisition of new ideas and new attitudes? In terms of personality theory, how fixed is a person's behavior likely to be from the beginning to the end of life? How consistent can we make personality through our educational program? How fixed in direction do we want life to be?

The complementary question may be restated: Is there sufficient unity in behavior to speak of personality or the self as if it were one, a unit, almost completely integrated? We are all familiar with the divided self—at least with the divergence between "what I believe I ought to do" and "what I do." We recognize at times our own pronounced shifts from one dominating interest or "self" to another, whereas at other times important shifts are made without full awareness on our part. The self has considerable difficulty keeping track of its shifting self! Although it is desirable to be sensitive to this problem of disunity as related to school education, it appears more feasible to approach this aspect of the question of consistency following the discussion of the assumptions involved in the continuity concept.

Continuity and heredity: two questions

Our recognition and observation of the degree of continuity in the behavior of a school pupil is likely to be influenced by our assumptions about biological heredity. To many people heredity implies a fixed tendency, a persisting disposition, or a definite trend, that would limit education to one path. Part of the difficulty flowing from such assumptions comes from confusing two different questions in one. Therefore, we shall ask the two pertinent questions separately. First, how accurately can we predict the personality characteristics of a boy or girl from our acquaintance with the parents and siblings of the child? Second, how does biological heredity, whatever its quality, contribute to learning capacity, emotional temperament, and other aspects of personality affecting the educative process? The first question is concerned with the specific expectations of parents and teachers about a certain boy or girl. The second question is concerned with the general limits that people commonly associate with those personality characteristics that they believe are related primarily to the physiological hereditary materials, the genes, rather than to the influences of the social environment. A common assumption is that heredity fixes or predetermines certain characteristics, whereas others are left open to favorable modification through the efforts of parents, teachers, and the rest of the community. A consideration of the first question may clear the way for insight concerning the second.

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[4] L. E. Cole, and W. F. Bruce, *Educational Psychology* (2nd ed.; Yonkers, N. Y.: World Book Company, 1958), pp. 106 ff., 243-248.

Are family characteristics predictable? The prediction of personality from acquaintance with the mother, father, sisters, and brothers of a child is so uncertain that it is logical for teachers to regard all daughters and sons as foster children of unknown parentage adopted in early infancy by their families. Although it is probable that a child will resemble his parents in intelligence, the teacher should be prepared for the occasional exceptions. Although the chance is only about one in fifty that a pair of parents with an average IQ of 100 will give birth to a child with an IQ as low as 65 or as high as 140, teachers need to be aware of such possibilities. Too often both parents and teachers are misled into thinking that a second child will be similar to his older sibling in scholastic ability and bookish or nonbookish interests.[5]

It is evident that similarity between parents and siblings in general temperament and specialized interests is likely to be an outcome in some measure of intimate contacts in the home. Moreover, our appraisal of the contributions of heredity and environment, or nature and nurture, is obscured by the custom of parents nurturing their own biological offspring. Thus, the teacher who studies the child's personality *as if* he were as biologically distinct from his parents as a foster child has all the more reason for knowing something about the kind of "fostering" care the home is providing. Since the contributions of the home environment occur through a learning process, it therefore follows that any habit, attitude, or idea that has been learned is susceptible of *re*-learning and even *un*-learning.

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[5] See Chapter 25, "Individual Differences," by F. S. Freeman.

From these considerations we reach the conclusion that no child is bound by fixed, predictable hereditary processes to be very much like his parents in intelligence, temperament, interests, and other aspects of his personality. Now we are ready to turn to the second question: How do these unpredictable, but still dynamic, biological processes of hereditary origin operate with the environment in contributing to physique, temperament, motive, learning capacity, and other aspects of personality that affect the educative process?

How are nature and nurture related in the continuity of personality? Our second question involves inquiry into the assumption that "nature," or biological heredity, controls continuity of development in relatively fixed directions whereas "nurture," or the influence of environmental conditions, is susceptible of modification through social action and reinterpretation by learning and personal insight. This question of continuity becomes the educational problem of how much the teacher and school can contribute to personality development through dealing with such important aspects of the self as physique, temperament, intelligence, motive, and sex. In the discussion it will appear that the five chosen aspects are interrelated in complex ways in their effects upon learning and that the effects of nature and nurture are in many cases not clearly separable.

Physique: George, an overweight 11-year-old. To many teachers, body build appears a relatively simple aspect of personality, far removed from most classroom learning. In some instances, however, physique has such profound effects upon school education that we become sensitive to its wider implications for every learner. An example of this is George, who happens to be short in stature and has a tendency to put on weight easily. So far as we know, we can credit largely to heredity both these characteristics of being below average height among his schoolmates and of being equipped with a physiological system which turns food into body fat at a rate higher than average

Even though his blood relatives may be of average height or above, and generally free of the easily fattening tendency, George's personal inheritance makes it likely that he will go through life in this particular physique channel, which is normal for him. What this continuity of physique means for continuity of personality is the question.

To look first at the possibility of retardation in personality development as related to a peculiarity of physique, let us consider the study by Hilda Bruch,[6] of eleven-year-old George. He was teased by his schoolmates: "Why don't you buy a brassiere?" they joked, pointing at his womanish breasts. Being sensitive in temperament, George tended to avoid his pals rather than reply with a bit of aggressive repartee, as many a fat boy does. Furthermore, an older boy, whom George regarded highly, played upon his ignorance of sex by shouting in the gym shower, "You'll grow up like a woman and never be a real man!" Like too many preadolescent boys who have lost confidence in their elders, George kept his troubles to himself. As a result, neither parents nor teachers knew what was interfering with his school work. When summer vacation came, instead of being out on the ball field with the other boys, George sat at home by the radio eating, eating, eating.

It is easy to predict the cumulating outcomes. George grew fatter and fatter, while his mother indulged his eating, not realizing the false comfort he was getting. Of course, he became slower and slower on the ball field, more and more likely to be chosen last or just left on the sidelines. This snowballing of motility handicap, being discounted by peers, feeling of personal shame, and dependence upon mother, as they continued over the weeks, illustrate the dangers to personality development that may evolve out of a relatively common tendency to fatten easily. Thus, any physical peculiarity may be so magnified by self-pity under conditions of social neglect that disintegration of self-confidence can almost block the educative process completely.

In the case of George, Dr. Bruch describes how his mother finally took him to the child guidance clinic for help. Here the family physician's incorrect diagnosis of "incurable gland trouble" was replaced by assurance for George and his mother of the probability that normal weight and sexual development could be achieved by changing the environmental conditions. Following the clinic's recommendations about eating less and engaging in outdoor games more, George in six months lost thirty-nine pounds, gained in playing skill and social acceptance among his peers, and began to show independence of his mother in his "grown-up ideas."

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[6] H. Bruch, "Obesity in Childhood: III. Physiologic and Psychologic Aspects of Food Intake of Obese Children," *American Journal of Diseases of Children*, LIX, No. 4 (Apr., 1940), 739-781.

The case of George illustrates how often something can be done to relieve a handicap, when its nature is understood. Furthermore, the alert teacher learns to recognize the relations of scholastic difficulty to physical and other handicaps, including the intervening emotional attitudes.

As teachers aid the parents and peers of a child to accept individuality of physique as one form of the "normal," which physiologists like Wetzel[7] show it to be, then the learner will be more likely to accept the self, the personality, he is, without a feeling of being too different from his fellows. Under these conditions of self-acceptance and group acceptance, almost any peculiarity of physique that heredity and environment together confer upon us may become an asset of personality. Insofar as physique gives a distinction, each of us can say with satisfying self-respect, "I am myself—a unique person." Each of us can welcome the degree of continuity in personality that physique contributes.

Temperament: an unexplained residual. We use the term "temperament" in referring to a person's more-or-less persistent manner of thinking, feeling, and acting, which we cannot account for through physique, intelligence, definable motive, sex classification, or other traceable factors. In the light of modern psychological research, temperament remains a dark continent. In fact, this ill-defined aspect of continuity in personality seems to be the unknown that is left over, the unexplained residual.

For example, when we try to trace "sensitivity of temperament," which was mentioned in the previous section as characteristic of overweight George, we have great difficulty in pinning it down to biological sources. We can measure sensitivity of the various sense organs to touch, light, sound, taste, and other environmental stimuli, but we mean by "sensitivity of temperament" a much more general response to situations that are essentially social. When we follow the lead of emotional pressures back toward the action of the endocrine glands, looking for physiological relations to temperament, we find, as has been said elsewhere,[8] that although "the chemistry of the body—due to glandular activity—plays a part in the general determination of temperament," there is no definite correspondence between inherent body chemistry and a particular type of personality. Although in describing a person it may be helpful to refer to him as sensitive or insensitive, as phlegmatic or excitable, as generally happy or sober, it may be wiser not to add the term "temperament" after these adjectives, if the word implies a greater degree of continuity than is known to exist.

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[7] N. C. Wetzel, "Assessing the Physical Condition of Children," *Journal of Pediatrics*, XII (Jan.—Mar., 1943), 82-110, 208-225, 329-361.

Since, in its various uses, the term "temperament" tends to conceal so much misunderstanding, we agree with Gardner Murphy, in that "it seems best to make sparing use of it."[9] Instead, as teachers we should be asking ourselves frankly: Under what circumstances does this boy or girl seem oversensitive? What underlies this learner's excitability and that one's soberness? Here the teacher needs to map out a plan involving both acceptance of certain persisting general qualities and alertness in fitting these characteristics into a developing process that has a mitigating effect upon any inhibiting factors.

Intelligence: a dearth of evidence. In most cases the general intelligence of each learner, as shown by tests, exhibits a considerable degree of continuity throughout the school years from age six to eighteen. The common assumption is that continuity in this intellectual aspect of personality is due to heredity or the "nature" component being supported by stability in the environment of the learner, in his home, school, and community. When the environmental conditions are radically altered, significant changes in test intelligence and greater changes in personality often occur, as is scientifically demonstrated in the studies made of "identical twins," who have the same heredity but different environments owing to being separated early in life.

For example, Mabel and Mary, identical twins separated at the age of five months, were exposed from the age of six to the contrast between town and country living. The Stanford-Binet intelligence test showed Mary, the town girl, at the age of twenty-nine to have a mental age of seventeen, an IQ of 106.2 (based upon an assumption of intellectual maturity at age sixteen); whereas Mabel had a mental age of fourteen, an IQ of 88.5.[10] This difference of nearly 18 points in intelligence quotient, in spite of identical heredity, is larger than the average difference for random pairs of *unrelated* children. Furthermore, the personality differences at the age of twenty-nine were striking. The town-reared Mary was quiet, feminine in speech, and her interests centered in school, books, and music. Mabel, the country-raised twin, seemed to dominate her sister, was emotionally stable, talked more freely, and exhibited a kind of practical "horse sense" that made her appear to the examiner much more capable than Mary. Such differences, in spite of the same biological heredity, make educators appreciate more fully the possibilities that lie in the improvement of home, school, and community environment.

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[8] W. F. Bruce, and F. S. Freeman, *Development and Learning* (New York: Henry Holt & Company, Inc., 1942), p. 197.

[9] Murphy, *op. cit.*, p. 79.

Respect for these possibilities in the emergence of unique personality patterns is reinforced by a dearth of evidence concerning the inheritance of general intelligence. Due to the unpredictability of intelligence from human matings, as indicated in a previous section, recent attacks upon the problem of the inheritance and presumed continuity of intellectual capacity have turned to nonhuman mammals, in which somewhat distinct strains could be produced by in-breeding through several generations. The rat, which has long served in experiments throwing much light upon brain processes,[11] has proved to be one of the most useful sources of understanding in this related area. As reported by Ernest Hilgard,[12] when the intelligence of rats was tested in terms of ability in running conventional mazes, "maze-bright" and "maze-dull" groups were developed through several generations. A consistent continuity of maze-running ability was found in the succeeding generations. To quote Hilgard: "Thus a hereditary component for one kind of learning was clearly demonstrated, . . . [but] the 'brightness' and 'dullness' turned out to be specific for maze learning. When confronted with other learning tasks, the 'bright' rats did no better than the 'dull' ones." In other words, "general intelligence" does not appear to maintain continuity through inheritance in this mammal, although the rat's biological patterns of interaction both in the brain and among the hereditary materials, the genes, are similar to those in man. Although the evidence that human inheritance follows the genetic principles found in rats and other animals is fairly satisfactory for eye-color, hair-color, and many other features of physique, we must remember, as Hilgard remarks, "The evidence regarding the inheritance of psychological characteristics is much harder to evaluate."

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[10] Cole and Bruce, *op. cit.*, p. 134.

[11] K. S. Lashley, *Brain Mechanisms and Intelligence* (Chicago: University of Chicago Press, 1929).

[12] E. Hilgard, *Introduction to Psychology* (2nd ed.; New York: Harcourt, Brace & Company, 1957), pp. 452-453.

Since the most adequate studies available indicate that continuity in intelligence is specific rather than general in this representative mammal, the rat, we are still left with a dearth of evidence concerning the sources of the degree of continuity in test intelligence found among school learners. This dearth of evidence of continuity predetermined by heredity can become a positive encouragement to the teacher to keep the opportunity for intellectual development open wide to every boy and girl. Although the teacher should not expect radical changes in ability to do school work, a cautious combining of the evidence for specificity of dullness and brightness with the evidence of divergence arising from differences in environmental influences in cases of known hereditary identity, as in the twins, Mabel and Mary, gives the teacher a substantial basis for confidence. Evidently, the degree of continuity usually present in intellectual ability is by no means a fixed barrier to educative progress and to development of a well-rounded, effective personality.

Motive: Henry, John, and Fred—identical triplets. Further light upon the degree of continuity in personality may come from an examination of the development of a central motive in the life styles of the identical triplets, Henry, John, and Fred. Again, the study [13] presents the ideal situation sought by the scientist in experimentation, for the heredity of the three brothers is identical. Produced by the division of a single fertilized cell, the genes of these monozygotic triplets gave each the same biological heredity at conception. Nevertheless, a great divergence in the motive aspect of personality became pronounced long before they entered the first grade of the elementary school.

As often happens with twins and triplets, the intra-uterine environment differed so greatly in its effects that at birth Henry was a weakling compared to his brothers. Consequently, the parents devoted themselves to him, giving him a "spoiled child" treatment. As he gained in strength and weight, Henry became the domineering one of the three. He threw tantrums when he could not get his own way otherwise. He was disobedient to his parents and destructive of everybody's property. Henry's central motive in life might be expressed: "Me first, and let's start something new."

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[13] L. W. Sontag, and V. L. Nelson, "I. Study of a Set of Identical Triplets; II. Behavior of a Set of Identical Triplets," *Journal of Genetic Psychology*, XLII (1933), 406-422.

When the boys were as young as eight months, their mother realized that she was neglecting John to pamper Henry. Before long, as a consequence of her efforts to make up to him for neglect, John became a typical "Mama's boy." While still howling for her, John returned his mother's attention by protecting her belongings from his brothers' depredations and telling her tales on them. Thus, John grew up to be a polite, obedient, well-mannered conformist, whose central motive seemed to be: "Let's be nice to everybody and never try anything new."

Fred's behavior fell between the extremes of Henry and John. He minded his mother better than defiant Henry, but paid much less attention to her absences than did howling John. His calm complacency reduced his central motive, if he could be said to have one, to a placid: "I'll take life as it comes, whether old or new."

Thus, three distinct personalities emerged out of identical biological equipment at the very beginning of life, out of the "same" intra-uterine environment, out of the "same" home, out of the "same" preschool play experiences, to confront a more or less surprised first-grade teacher on the opening day of school. It is probable, however, that their reputations preceded Fred, John, and Henry, and that their teacher was prepared, as every teacher should be, to recognize each identical triplet or twin, fraternal twin, or non-twin sibling, as the distinct personality he really is in spite of being born and reared in the same family as his differing brothers and sisters.

Further light upon the development of motive has come from the studies of the anthropologists in primitive societies.[14] For example, in the compilation of studies edited by Margaret Mead,[15] it becomes clear that whole tribes maintain throughout many generations motives as drastically contrasting as a sharp, competitive struggle to be first in position and a well-nigh universal desire to share everything of value with the other members of the tribal group. Instances of these long continuing, divergent motives are found among tribes with a common

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[14] E. R. Service, *A Profile of Primitive Culture* (New York: Harper & Brothers, 1958).

[15] M. Mead, (ed.), *Cooperation and Competition among Primitive Peoples* (New York: McGraw-Hill Book Company, Inc., 1937).

American Indian biological background, such as the Hopi and the Kwakiutl.[16] Thus, the contrast in motive developed by Henry and John from identical heredity within a few preschool years, carrying a considerable probability of continuity throughout their lives, can be seen in whole tribes with evidence of continuity through many generations in a relatively isolated, and therefore static, society. These social origins of contrasting motives suggest that in modern American society the way is open for both Henry and John, for every boy and girl, to find a way of life in which the competitive and cooperative motives both contribute constructively.

Sex membership: personality as masculine or feminine. The sex differentiation between girls and boys has a biological continuity throughout life that results in diverse treatment by family, peers, and society in general, from the day of birth. Although the positions, responsibilities, and treatment of men and women vary in different cultures and in different social classes within these cultures, it is a universal practice to regard the woman as different from the man. Although the sharpness of many sex distinctions have been reduced in modern America, we still tend to expect a boy to be courageous and "manly," while we hope a girl will be a bit more refined and "ladylike."

It has been claimed that more emphasis is laid by parents on conformity in the case of girls than of boys. To the degree that girls do conform more fully to the requirements set by their teachers, and to the degree that these teachers still prefer conformity to rebelliousness, the girls may get a shade of advantage in their school marks.[17] How far such inclinations, derived from customary attitudes persisting in our culture, modify the treatment by teachers of girl and boy personalities and thereby affect the personal development of each sex differently is worthy of consideration by any teacher—woman or man.

The development of girls and boys in school is further complicated by certain differences between the standards or criteria employed by men and by women teachers in judging the personality of learners, regardless of sex. In a recent study, Harry Beilin and Emmy Werner[18] find considerable agreement between men and women teachers in the criteria used to characterize the best and most poorly adjusted high-school youth. There were differences in emphasis, however, large enough to warn both the male and female teacher of sex-oriented cultural bias, of which neither may be aware. To quote from the conclusions: "The criteria used significantly more by men teachers are maturity, good judgment, dependability, trustworthiness, lack of self-consciousness, and being secure as a person." The criteria that women teachers characteristically employ are humility and modesty. The women teachers also place greater stress, in regard to poor adjustment, upon "negativism, hostility to authority, discipline problems, and getting into trouble in school." In this study, the items classified under "character-control" were more often mentioned as favored criteria by the women teachers, whereas those items grouped under "emotional-personality" were more often used by men teachers. To what degree such differences in attitude between men and women teachers are prevalent is an open question, but the data suggest a consideration by all teachers of the standards by which they evaluate the personality of the learners in their classes.

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[16] Cole and Bruce, *op. cit.*, p. 253.

[17] S. T. Hadley, "A School Mark—Fact or Fancy," *Educational Administration and Supervision*, XL, No. 5 (1954), 305-312.

[18] H. Beilin, and E. Werner, "Sex Differences among Teachers in the Use of the Criteria of Adjustment," *Journal of Educational Psychology*, XLVIII, No. 7 (Nov., 1957), 426-436.

The combining of suggestions from the scientific studies that trace the social origins of our notions about the preservation of certain differences between boys and girls, with those studies that expose the diversity of attitude between men and women teachers, apparently compounds the influence of sex differentiation in education. A man teacher's way of appraising both the school work and the personality of a girl learner may be several steps away from a woman teacher's estimate of a boy's school mark and of him as a person.

Such studies disclose the high degree of continuity in personality due to cultural differences between masculinity and femininity that are carried almost as persistently by custom as they would be if these personal traits had a specific biological origin in male as distinct from female heredity. Although the anthropologists and sociologists have been assisting the psychologists in freeing man of unnecessary fears of bondage to his biological forebears, their studies of the force of tradition and custom have tended to perpetuate in teachers a feeling of hopelessness about improving the culture in which they are immersed. The growing awareness of the cultural sources of personality aspects, such as masculinity and femininity, however, provide an opportunity to employ educative processes confidently for reducing any bias that sex identification may generate.

Dynamics of unity: integration of personality

Having considered the developmental continuity of personality in terms of physique, temperament, intelligence, motive, and sex differentiation through the life span of representative individuals, supplemented by consideration of the persistence for generations of certain cultural attitudes in established societies, we can deal more briefly with the dynamics of unity—the problem of integration of personality (or removal of feelings of conflict) for the individual. As indicated earlier, in our analysis, the dynamics of unity involve the degree to which the actions and attitudes of a single individual are related as these follow each other in quick succession. Here our concern is with the conflicts occurring within the self, which seem to inhibit action at one time and at another to drive behavior toward the irrational. Each of us has enough experience to appreciate the existence of this problem, even though we may not be able to follow many of the ramifications the psychologists have elaborated.

One psychoanalytic approach assumes division in the self or mind between the "conscious" and the "unconscious." We prefer here to think of the attitudes of which we are more fully or less fully aware—of relative "unawareness" and "awareness." Sometimes "unconsciousness" or "unawareness" is associated with the term "emotion," whereas "consciousness" or "awareness" is associated with the term "intellect." For the purpose of theoretical ventures toward understanding the complex human personality, such contrasts may be helpful, if the teacher consistently bears in mind that each boy and girl, as a person, is engaged in an indivisible process of continuous development.

It may also be helpful to refer the "unconscious" or "unaware" aspects of personality especially to the period of infancy before speech has given the young child a verbal handle by which to grasp whatever "conscious awareness" he may have of himself as distinguished from others. Teachers may well listen to the psychologist's serious warning that personality throughout life is likely to be influenced profoundly for good or ill by the security or anxiety of the person who cares for the child. Such warnings become helpful when they are not conceived as a condemnation to a life of anxiety, but are taken as calling attention to the need of building security in the insecure through appropriate experiences.

How greatly the tracing of the successive oral, anal, and phallic stages in the life of the baby, and the division of the self into the id, ego, and super-ego, supplemented by studies of the hypnotic state, have contributed to a sounder understanding of personality dynamics and development. may be open to question.[19] However, there is no doubt that the realization of the disunity plaguing all our lives is the beginning of psychologic and educative wisdom. The sooner we begin to sense how highly inconsistent are our statements, thoughts, and actions within a brief period of time, the sooner we can begin to promote our own integrity rationally and to help others toward a degree of personal unity. When we see how our personal stability is undermined each day by twists in what we call thinking, but to which the psychologists have given such labels as compensation, projection, identification, sublimation, displacement, compartmentalization, and rationalization, then we may find ways of avoiding these pitfalls. Thus, the studies of the clinical psychologists concerning the emotional maladjustments of adults may make one of its greatest contributions by helping teachers to see how they can promote emotional stability in the classroom and unity in the life of the learner.

Personality types: consistency to a degree

A concept of consistency to a substantial degree, in the life of each person, emerges from the study of continuity in development and of the dynamics of unity. Since we cannot have perfect unity in even one day of our life, and since the recurring tensions may contribute to a lively awareness of the dynamic processes, we learn to accept the degree of integration found in ourselves and others as a basis for further unity. Since continuity from infancy throughout life does not necessarily imply a fixed, unchanging personality, we can accept the development of one's life style as a process of growth that is always open to guidance. Thus, the teacher can combine an understanding of the degree of continuity with a view of the degree of integration present into plans for a greater degree of dynamic, ever-moving consistency in the life of each learner, and his own life as well. In other words, the objective of consistency in personality, instead of narrowing the learner's life path, becomes an open, growing ideal.

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[19] L. E. Cole, *Human Behavior: Psychology as a Social Science* (Yonkers, N.Y.: World Book Company, 1953), part VII, "The Structure and Dynamics of the Self System."

With such a degree of consistency, rather than a fixed, inflexible pattern, as our basic concept of personality, it is appropriate to refer to certain diverse personality types. In order to emphasize the variety of personality patterns found in every classroom as the resultants of distinct biological backgrounds and varied experiences, Ogburn and Nimkoff[20] offer a representative list: the self-centered person, who carries to an extreme the value most people justly place on themselves; the gambler, who ventures far beyond the limits of conservatism; the rebel, who reacts strongly against even the suggestion of domination; the leader, who understands people well enough to enjoy manipulating them; the narcissist, who admires himself excessively; and the exhibitionist, who is very fond of showing off for the sake of public applause. Such types are merely convenient labels for persons who carry to an extreme some very human characteristic. Indeed, at the moderate level most of these attitudes can contribute to the well-rounded personality. When self-centeredness is reduced to a consideration of the consequences to oneself, as well as to others, of a proposed social action, personality is likely to be strengthened by such concern. Some of us may well take greater risks than we commonly do without being likely to gamble our lives away. Certainly, the world owes a great debt to rebels in politics, in science, and in the arts, who have waged combat with the rigidity of culture. The leader, too, may use his talents in behalf of the group, giving joy to all concerned. When narcissism is translated into an appropriate degree of self-awareness, new avenues for personality development may be opened. And who does not appreciate the "show-off," when he goes only so far as to become "the life of the party"? Since no pretense is made that this selection of various types implies any special scientific classification, these names can be used without suggesting more consistency than actually exists.

Thus, the teacher who recognizes a common personality type in a learner can use an *understanding* of the characteristics involved in guiding development wisely. When used as a hint in designing a program that leads toward wholesome balancing, the personality characterization serves usefully. Any typing, however, that assumes that these extreme characteristics are *fixed*, either by heredity, by subconscious experiences of early infancy, or the heavy hand of the culture's customs during childhood or later years, may become an obstacle to the personality adjustment and development, for which the school is partly responsible. The variety of personality types in every school class actually offers the teacher opportunities for arranging beneficial interpersonal contacts within the group to promote the open ideal envisioned for each differing learner.

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[20] W. F. Ogburn. and M. F. Nimkoff, *Sociology* (3rd ed.; Boston: Houghton Mifflin Company, 1958), pp. 266-267.

Instruments for appraising personality

Although the last part of the present volume is devoted to evaluation and measurement in the school, a word about available instruments for appraising the personalities of learners is in place. In considering the usefulness of personality rating scales, personality inventories, and related instruments, we turn in this specialized field to F. S. Freeman's work.[21] In introducing this area of testing, Freeman orients our approach by defining a personality as "the individuality that emerges from interaction between a psychobiological organism and the world in which he has developed and lives."[22] In the light of this comprehensive definition, which is closely related to the purport of our present chapter, Freeman points out that *rating scales* tend to identify only the more or less superficial impressions made upon others in terms of attractiveness and reputation by the overt actions of an individual. The rating scales actually "ignore the *inner* aspects of personality: the perceptions, feelings, reactions, attitudes, values, prejudices which are the basis of one's behavior."[23] Now these "inner" qualities of the learner's life are prime concerns of the teacher. In fact, any superficial behavior that is a pretense and not deeply genuine takes us away from the central concern of the present chapter with the whole personality of the learner and away from the aim of the following chapter, dealing with learners' adjustment problems.

In *personality inventories*, as distinguished from rating scales, Freeman indicates that some attempts are made to include these important, but not obvious, aspects of personality. Furthermore, *projective methods* are actually designed to reveal the subtler qualities of personality. Although some of these instruments may be useful to the well-trained teacher, every teacher needs to be forewarned that the data they furnish require careful scrutiny and wise interpretation. There is the danger in the use of these instruments, as well as of other measuring devices applied to learners in schools, that the teacher will assume too readily that more has been revealed about the complex personality of a learner than is actually the case.

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[21] F. S. Freeman, *Theory and Practice of Psychological Testing* (rev. ed.; New York: Henry Holt & Company, Inc., 1955), chaps. 17–20.

[22] *Ibid.*, p. 453.

[23] *Ibid.*, p. 452.

The ideal in a teacher's personality theory

Whatever theory of personality development and dynamics a teacher creates out of his experience with people and his reading and thinking in the field of human psychology, it is incomplete as a working hypothesis unless it incorporates a forward look, an ideal to pursue. It is evident from the consistent, yet flexible, nature of personality that the ideal can scarcely be defined rigidly.

As a suggestion in regard to the direction in which a teacher might seek an ideal, we propose a welding of two related lines of thought. One of these thought trends has been elaborated recently by A. H. Maslow,[24] under the title "Self-actualizing People", whereas for a comprehensive study of the other trend we turn back to John Dewey's *Democracy and Education.*[25] When the teacher tries to combine these suggestions from clinical psychology and from modern philosophy into a single broad ideal, he will find that it can be applied in at least three directions. He can use it while thinking of the youthful learners he guides, of his adult associates in the school and its community, and of the development of his own personality. The nature of the emerging personality inherently demands giving attention to self as well as to others in order to function fully.

As features of the "self-actualizing" personality, Maslow records from his detailed and intimate study of selected persons a number of characteristic attitudes. Since, as has been said elsewhere, " 'Self' is a treacherous word in discussions of learning and teaching,"[26] it is well to recognize that the "self" in "self-actualizing" is not a static one merely expressing what is within, but a changing, dynamic self. Maslow speaks first of the self-actualizing person's more efficient perception of reality and more comfortable relations with it—not retreating into daydreaming and futile wishing. Along with this realistic approach goes an acceptance of self, others, and nature—taking the natural and social environment as well as one's own capabilities as the basis for daily action. Another characteristic found among the more fully self-actualizing people is a certain spontaneity, so that one's expressions of himself come forth without undue fear of what the "crowd" says. Problem-centering rather than centering upon the limitations of oneself and the people with whom one works is another aspect of self-actualizing personality. There is also a continued freshness of approach, a readiness to find values in new areas of thought and in new people. Another important attitude is a deep feeling of respect and regard for human beings in general, in spite of occasional impatience and disgust with the behavior of some people: an attitude a teacher might wish to have toward all learners, unselected as they are. The interpersonal relations of the self-actualizing person are deep and profound, such as occurs occasionally in "chumming" of preadolescents and in the enduring friendships of later years. These paraphrased selections from the Maslow study are sufficient to suggest to the teacher an ideal to which clinical psychology has greatly contributed.

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[24] A. H. Maslow, "Self-actualizing People: A Study of Psychological Health," in C. E. Maustakas (ed.), *The Self: Explorations in Personal Growth* (New York: Harper & Brothers, 1956).

[25] J. Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (New York: The Macmillan Company, 1916).

[26] W. F. Bruce, *Principles of Democratic Education.* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1939), p. 210.

To the thoughtful teacher, it will appear that development toward the self-actualizing type of personality can occur best within a democratic society. Indeed, Maslow indicates that self-actualizing people turn out to have "a democratic character structure" as contrasted with domineering, authoritarian attitudes. This kind of character structure promotes the widened sharing of common interests within groups and the free interaction between social groups, by which Dewey[27] and Bode[28] have characterized democracy, and with the characteristics of democracy mentioned by Thayer:[29] "respect for the integrity of personality. the ideal of mutually creative relations between individuals and groups, and the peaceful resolution of conflicts and differences." Self-actualizing and democratic living seem to fit together so neatly that one promotes the other, although the former has origins that are more scientifically psychological and the latter more philosophically educational.

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[27] Dewey, *op. cit.*, p. 100.

[28] B. H. Bode. *Democracy as a Way of Life* (New York: The Macmillan Company. 1937).

[29] V. T. Thayer, "Today's Challenge to Education" (Opening address, School Week. School of Education, University of North Carolina, Chapel Hill, N. C., June 10, 1958).

Whatever ideal the teacher designs as the capstone of this theory of personality, it is here suggested that its roots go back into both the scientific and philosophic areas of human thought. Furthermore, when the personal experience of the teacher is adequately recognized as a strongly contributing source, the chances are good that the theory of personality will be kept open for further refinement as it is used. Such a functioning concept of personality is a valuable tool in the study of educational psychology and in the practical work of the school.

QUESTIONS AND EXERCISES

for discussion and study

1. Observe a young child who has recently learned to talk, noticing how he refers to himself. What does this observation teach you about personality development in its early stages?

2. Let three observers keep as complete a record as possible of a child's behavior during a thirty-minute period, recording only the acts that are so objective that all three observers can be expected to see and agree upon them. Repeat the foregoing exercise, but this time include more interpretive material concerning the behavior. Which of the samples yields more significant material in accounting for the behavior of the child? Do you sense in the reports of the other observers the influence of their own personalities? What influences can you detect in your own report?

3. Illustrate the following from your experiences as learner or teacher: A teacher's approach to a learner determines the facts he observes. Show how two personality systems are involved.

4. What is meant by "respecting the personality" of the learner? How is such "respect" related to learning "self-discipline"?

5. How is the uniqueness of the biological heredity of each individual related to the uniqueness of his experience in the development of his personality? How are heredity and environment related in the development of a child among the "blood relatives" of his family?

6. List a number of factors that have contributed to the development of a person you know well. Make another list for a quite different person. Do the several factors have the same relative influence in each case? Try making such a list about yourself, indicating the relative influence or importance of the different factors. Can you draw any significant ideas about personality development from comparing the three lists?

7 How is continuity in personality related to the possibility of developing a well-rounded person?

8 Make concrete suggestions for changing personality in two learners you know well who are distinctly different from each other. If you wish, make such suggestions in regard to your own development, indicating some of the major difficulties to be met in carrying out your own suggestions.

9 Discuss the following problem: In trying to develop the cooperative personality through school experiences, are teachers producing individuals who will be unfit for our highly competitive society? How should competition and cooperation be adjusted in the school? In this connection, state your own ideal for personality development at a particular age level with which you are concerned. How is your ideal for the school learner related to your ideal for adults?

10 Considering a school you know well, what aspects of personality development for its learners should be given more emphasis than occurs in this chapter? What statements in this chapter do you wish to challenge with evidence?

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CHAPTER 5

Personality and children's adjustment problems

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The learner and the school

EVERY SCHOOL LEARNER, from his beginning days in first grade until high-school graduation twelve years later, makes a long series of adjustments between the whole unique personality he is and the program of the school. Each girl and boy is seeking to become an individual person having a healthy physique, a growing intellectual ability, a greater degree of emotional poise, an increased participation in social groups, and such other characteristics as enhance personality. At the same time, through its curriculum, the school is attempting to develop this person into as efficient a learner in the realms of modern living as the capacities of the girl or boy permit. Since the school represents society at large, the learners' adjustment problems can be regarded as one phase in the development of growing individuals and, hence, of society. Broadly speaking, the consideration of personality and learners' adjustment problems may be considered as the daily interaction between the particular developmental strivings of this girl or boy and the general educational program of the school. Although in many instances modern schools have accepted responsibility for adjusting their programs to the diverse needs of individual learners, the discussion in this chapter is concerned primarily with the kinds of personal, psychological adjustments the individual makes while under the guidance of teachers and other members of the school staff.

Nature of adjustment

Although the actual nature of the personal adjustment of the school learner will become clearer as the discussion moves forward, a few preliminary suggestions may be useful in viewing the teacher's task as one of aiding learners in their problems of adjustment.

First, the learner adjusts actively *in* the school environment rather than passively adjusting *to* the school's program. When a learner enters a class, he does something to that group, just as the group does something to him. This concept of dynamic interaction between the individual and the group has roots both in modern interpretations of the learning process and in current studies of the psychology of group living. This view fits neatly also with the democratic philosopher's insistence that each individual shall count as a contributor to his society as well as a recipient of the benefits of sharing in the life of the group. As has been said elsewhere concerning the emotionally stable person, "the organization of personality to the point of stability involves an active adjustment of the individual *in* his physical and social environment rather than a passive adjustment *to* or acceptance *of* his environment."[1] Unless some such qualification is made, the term "adjustment" may be misinterpreted, as Lindgren[2] and others have pointed out.

Second, we do not mean here by adjustment any unhealthy twisting of one's personality through withdrawing from others, evading responsibility, or deceiving oneself, however much comfort may come therefrom. Rather, we here seek under the title "adjustment" healthy, energetic participation in group activity, grasping of responsibility, at times to the point of leadership, and, above all, avoidance of any self-deception in the adjusting. The well-adjusted child meets his school environment with the initiative appropriate to a full sharing with others and the optimum development of himself.

Third, since the personality of the individual, as depicted in the preceding chapter, is so largely a product of learning, adjustment is essentially a process of re-learning. Although a variety of factors influence adjustments, directly or indirectly, many maladjustments are primarily the result of unfortunate learning experiences.[3] When interpreted broadly as learning in the whole realm of personality, adjustment has both a negative and a positive aspect. From the negative side, the elimination or reduction of emotional maladjustments is sought; whereas from the positive side, the focus is upon healthy, realistic ways of thinking and acting. Since adjustment is not a peculiar, mysterious, psychological trick, but a learning process, the continuity of personality characteristics gives the teacher confidence in the effectiveness of changes made in any school learner's pattern of life. While the well-adjusted teacher begins by accepting each individual learner as he *is*, this preliminary acceptance is really a basis for helping the learner toward what he may *become*.[4]

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[1] W. F. Bruce, and F. S. Freeman, *Development and Learning* (New York: Henry Holt & Company, Inc., 1942), p. 451.

[2] H. C. Lindgren, *Mental Health in Education* (New York: Henry Holt & Company, Inc., 1954), pp. 93–94.

Fourth, even the youngest school learner is *already a personality*. When the child of five or six years enters the first grade, he has already developed a self, for whose defense and protection he is deeply concerned. The young child has had many experiences through which he has fashioned particular habits or devices of adjustment, which serve him more or less usefully. For example, since the age of three or four he probably has been using the "sour-grapes" attitude when in need of comfort. Like the fox in the fable, who excused himself from the effort of the big jump by the assertion that he disdained the grapes because they were sour, so the child expresses disdain for the follow-the-leader game he is actually afraid to play. Thus, even the young child, as well as older folk, attempts to protect himself from the ridicule of his peers and his own feelings of inadequacy by excuses whose weakness goes unrecognized by the person making them.

Also, the preschool child has easily learned to put the blame on his sibling or playmate for any deviation from acceptable action, accidental or intentional, that occurs. Thus, he protects himself from the wrath of his elders by a device that under certain conditions the psychologists call a form of "projection." The condition that throws both the "sour-grapes" and the "projection" reactions into the defensive malajustment category is that the child deceives himself into assuming that his dislike for the game is his real reason for not participating and that the blame for his own mishap really belongs to someone else.

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[3] See L. F. Shaffer and E. J. Shoben, *The Psychology of Adjustment* (2nd ed., Boston: Houghton Mifflin Company, 1956).

[4] G. W. Allport, *Becoming: Basic Considerations for a Psychology of Personality* (New Haven: Yale University Press, 1955).

Such examples of self-defensive twists in the young child's thinking are sufficient to indicate to anyone the considerable advance in the patterning of the personality that occurs in the pre-school years, without our necessarily agreeing with the Freudian emphasis upon the establishment of fixed patterns of personality in infancy. Thus, our inquiry into the nature of adjustment may be based upon evidence that the children whom the first-grade teacher greets are already making many adjustments in their social environment. and that insofar as each adjustment is a learning process, which may help or hinder his further development, the way is open for the able teacher to guide the adjustment made in school in a direction that strengthens personality.

Facing reality on one's own

The candid and courageous facing of reality, facing the actual conditions in one's environment and being aware of the quality of one's own existing capacities, is a prime characteristic of adequate personal adjustment. This ideal of facing up to the real situation—within and without the individual—is derived in part from contrast with the dodges by which a person unwittingly deludes himself, as in giving a "sour-grapes" excuse or projecting blame upon others. Although the human inclination to evade reality persists throughout life, the unsophisticated school learner is particularly susceptible to such maladjustment. The elementary-school child, especially, is very dependent upon his elders for accurate information about the wide world. There is so little he can see with his own eyes and bring within his own personal experience that many misconceptions creep into his interpretations. Even when his parents and teachers are doing their best to guide him to information, he becomes confused by the inadequacy of his background, as many a humorous instance of reporting by children shows. Certainly, the six-year-old can scarcely be expected to understand his own emotions or appraise fairly his own abilities, when most adults are still in the early stages of using psychological findings in practical ways to guide themselves. So, in putting forth the facing of reality as a prime objective for the learner and for the teacher who would help him toward adequate personal adjustment, we are taking a first step into the central problem of this discussion.

Progress in learning to make adjustments to actual situations involves dealing *directly with one's own problems.* The six-year-old has to make his own childlish adjustments today, so that ten years hence he will be better able to make other more-or-less related adjustments peculiar to adolescence. In highly verbalized fields of study, such as history or even science and mathematics, teachers have been misled into assuming that pupils were learning when they were mainly repeating textbook statements on demand. Fortunately, more emphasis upon insight and understanding of original problems in science, for example, has done much to correct this misconception of the learning-teaching process. Those teachers who work in the field of manual skills as used in the applied or fine arts quickly learn the futility of words divorced from meanings. Such an understanding of learning is highly essential in guidance toward personal adjustment, for here the teacher is trying to help the learner into new ways of feeling, thinking, and behaving that run much deeper than memorized verbal rules of conduct. It follows that when each individual is dealing with his own unique, personal problem, he can do so only by a method that he is making his own as he goes along. The degree of similarity between emotional adjustment and understanding in art and social studies is such that the alert teacher may be able to detect some of the conditions that obscure reality for a learner. Thus, the teacher's responsibility is largely that of modifying the environmental conditions within the school so that the learner can more readily meet his personal problems realistically.

The improvement of *the teacher's own social-emotional adjustment* is an essential aspect of preparation for helping learners in their personal adjustment problems. For the purposes of this discussion of teacher and learner adjustment, we assume a close working relationship among several practical ideals that have been variously designated as mental health,[5] mental hygiene,[6] and emotional stability,[7] as well as adjustment.[8] Insofar as the teacher of mathematics, biology, or American history needs general subject-matter preparation in his specialized field, does it not follow that every teacher needs special preparation in the more general and more difficult field of personal adjustment? Added to this logical conclusion is the fact that in the area of personal adjustment *what the teacher is as a person* seems equally important as *what he knows about personality and adjustment.* The point is that teachers can *learn to be* better adjusted persons.

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[5] Association for Supervision and Curriculum Development, *Fostering Mental Health in Our Schools,* 1950 Yearbook (Washington, D.C.: National Education Association, 1950).

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[7] Bruce and Freeman, *op. cit.,* chap. 18, "Emotional Stability."

Thus, "facing reality on one's own" is not as lonesome a venture as one might think, for learners and teachers may work together to discover favorable conditions for personality adjustment and for avoiding the deceptive ways of thinking and acting that our common culture inflicts upon us all. In a very real sense, every learner learns for himself, but, as we shall see, he derives essential support from his peers and his elders. His parents and teachers, in turn, can gain support in their efforts from a host of past and present thinkers in psychology and the related fields of biology, sociology, anthropology, ethics, and philosophy.

Withdrawal from reality

Like the clinical psychologists, whose investigations of maladjustment paved the way for our present understanding of adequate adjustment, we turn to a consideration of the devices used in withdrawal from reality. Our purpose is to learn how to avoid these personality defects and the conditions contributing to such evasive behavior. Let us begin with the case of the withdrawn child, "the quiet one."[9] Fortunately, most teachers no longer pay attention only to those learners who draw attention to themselves, either by overparticipation or disrupting behavior. The modern teacher has an eye out for the pupil who never

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W. F. Bruce, and A. J. Holden, Jr., *The Teacher's Personal Development* (New York: Henry Holt & Company, Inc., 1957), chap. 3, "Personal Energy and Emotional Stability."

[8] K. Cobb, *Problem Behavior and Adjustment in Children* (Boston: Houghton Mifflin Company, 1951).

Shaffer and Shoben, *op. cit.*

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[9] Films such as *The Quiet One, Angry Boy, This Is Robert, Facing Reality,* and many others, throw vivid light upon the processes of adjustment.

volunteers, who never disturbs the class. Many schools have moved far toward giving serious concern to the withdrawn, reserved personality in the three decades that have elapsed since the pioneer studies of Wickman[10] showed how teachers of 1928 placed these kinds of personal problems low in importance as compared with transgressions against the authority of the school. The clinical psychologists, in contrast to the teachers, placed withdrawing and recessive behavior very high as threats to personal development. Anyone can see that unless a learner faces up to his responsibilities in the class group he can scarcely learn sound social-emotional adjustments. The "quiet one" learns less than he might in both subject matter and in personality realms, partly because he does not test his ideas in the forum of class discussion. Furthermore, with greater risks to his personal growth, the withdrawn child often is doing something else behind his mask of apparent apathy. So, the teacher's task of "drawing out" the withdrawn learner of six or sixteen years may involve at least the recognition of some of the devices commonly used by the "quiet ones." It must be kept in mind, however, that not all "quiet ones" are maladjusted.

Daydreaming is widely recognized by parents and teachers, who may never think of classifying this behavior as a "psychic mechanism" and labeling it "fantasy" or "phantasy." The fact that a child seems to be a daydreamer may be relatively unimportant, but, on the other hand, it may be a symptom of drastic evasion of the real situation and the practical problems with which he should be dealing. Under such conditions, daydreaming becomes a menace to personal development and a serious obstacle to progress in school, for daydreaming may cover a wide range from long, long thoughts in a field of special interest leading to constructive action, or it may be a way of comforting oneself when frustrated from reaching goals a person has already accepted for himself. Therefore, the teacher's task in some cases is to discover the special interest and further it as a means of enlarging and deepening the learner's educational life. In other cases, with which we are here particularly concerned, the teacher has the far more difficult task of getting at least a glimpse of the conditions frustrating the girl or boy's deepest desires. What does this young person want most? What are the hidden urges of which he himself is hardly aware? Daydreaming, besides being generally a time-wasting process, may be a symptom of some psychological maladjustment that progressively interferes with effective action and happy social relations. The teacher who recognizes daydreaming as a challenge to study the individual and to experiment with curriculum adjustments, regrouping within the class or school, and other ways of changing the conditions, may contribute greatly to the life of the *over*-quiet, *over*-withdrawn learner.

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[10] E. K. Wickman, *Children's Behavior and Teachers' Attitudes* (New York: Commonwealth Fund, 1928). (*See also* H. Berlen, "Teachers' and Clinicians' Attitudes Toward the Behavior Problems of Children: A Reappraisal," *Child Development*, XXX (1959), pp. 9-25.)

Regression is a form of withdrawal from reality by returning to behavior appropriate at an earlier age. Teachers in the early elementary grades often point out "babyish" children, while parents and teachers are sometimes accused of "acting like adolescents." In order to avoid the responsibilities of maturity expected at a certain age level, the individual retrogresses to the standards set for a younger person. Instead of courageously grasping the developmental tasks of their age group, the girls and boys fail to face the reality of their own growing up. When such an attitude is taken without the individual being aware of this backward slip in his emotional reactions to troublesome situations, the clinical psychologists designate the action by the term "regression," as a common mechanism of escape from reality.

A school may not be entirely blameless when many of its pupils show signs of regression. Teachers may well ask themselves: How well is the curriculum fitted to this age group? Are difficulty and interest related so that the learners are challenged? Are the methods of teaching appropriate for these boys and girls? Are the school tasks diversified enough to care for the four-year range of test intelligence and reading ability commonly found in each grade of the elementary and secondary school? When the school has faced and provided adequately for such realities in the learner group, then it is time to inquire about other causes underlying the behavior of the girl or boy who gives evidence of regressive inclinations. The conditions these learners are encountering in their homes and among their peers may throw light upon the special factors influencing them toward emotionalized dropping below the intellectual and social standards and capacities they would otherwise exhibit.

Although it may be difficult for a teacher to distinguish between the learner whose low ability is due to a variety of environmental conditions and the learner whose present attack upon his school tasks is affected primarily by regressive tendencies, the teacher may well regard the inclination to revert to the easier ways of earlier years as a persistent threat to all learners. Certainly, the awareness of the recurring temptation to regress needs to be safeguarded by a recognition of various other psychological realities bearing upon the behavior of both learners and teachers.

Negativism is another form of withdrawal from or avoidance of reality. As has been pointed out elsewhere, however, negativism, even in the young child, is not "an inevitable stage of temporary retardation in emotional development . . . traceable to a definite hereditary pattern,"[11] but a result primarily of adults using the child's slight acquaintance with meaningful language to redirect him suddenly away from his own chosen activities. No wonder the normal child responds with a sulky "no!" to such frustration, especially if the adult has persistently tried to curb the child's adventures with "don't, don't, don't" and "no, no, no!" It is easier to teach negativism than to reestablish initiative. The alert teacher asks: How much negativism is being *learned* in my class and in our school? How are learners helped in their adjustment as they enter elementary school, junior high school, senior high school, or college? Whether the negativism is learned early or late, the remedy lies in providing conditions favorable for learning to grasp reality along with its responsibilities. One of the essential conditions is that the teacher reduces his own negativism to reasonable proportions. Again, it is not a simple matter to distinguish clearly between a wise teacher's refusal, on the one hand, to be drawn into too many activities of the school and community, and, on the other hand, a blind, blanket refusal to participate adequately in school and community affairs. An awareness of the origins of negative attitudes in others and in oneself constitutes a safeguard against drifting unconsciously into the employment of this psychic mechanism. The negative individual is an immature person, whether at ten, twenty, or forty years of age.

Although clinical psychologists have identified as psychic mechanisms other forms of withdrawal from reality, giving them such distinctive labels as "insulation," "repression," the preceding discussion of daydreaming, regression, and negativism is without doubt sufficient to illustrate the fundamental principles of adjustment. In each form, the individual is unaware that he is avoiding reality, because he assumes that the situation actually is just the way it looks to him. The person who uses a psychic mechanism is making a pseudo-adjustment that satisfies and comforts him to some degree. While he daydreams in his particular world of fantasy, he is saving himself from the difficulties of his school tasks. By using the regressive device, a second- or third-grader psychologically lowers the standards he sets for himself to those of the easy life of the first grade, or the high-school student chooses the elementary-school teacher's close supervision over responsibilities of high school. In adopting a negative attitude a student substitutes an assertion of disinterest in a particular school subject and so tends to lighten his feeling of responsibility for study. He erects a protective shell around himself that "insulates" him from the class group and its demands upon him for his just share of effort in the joint project. He "represses" his own deeper wish to do his part and so comforts his educational conscience. He "identifies" with some person who has made a great success in life, but whose biographer asserts that the hero was a failure in the formal school of yesteryear. Thus, by one device or another, or by a combination of psychic twists, many a pupil deludes himself into appraising his withdrawal from the realities of the school life as a reasonable adjustment to the situation. Such a learner fails to realize the character of the pseudo-adjustment or maladjustment developing in his personality and spreading from the school situation to the individual's life outside the school and into the years beyond school days.

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[11] Bruce and Freeman, *op. cit.*, p. 94.

Again, the teacher's task includes finding out what conditions inside and outside the school are inducing such a pseudo-adjustment in the learner's personality. If the teacher too quickly attributes school failure to the learner's personal maladjustment, then the teacher himself may be withdrawing from the responsibility of studying the contributing factors, much as the young learner may withdraw. Although the personal history of the persistently withdrawing girl or boy may throw light upon the underlying causes, the actual remedies most available to teacher control are usually related closely to what is happening this week and this day as the learner encounters his classmates and teachers in school classes and extracurricular activities. In other words, consideration of "withdrawal from reality" may be more useful to the teacher as a guide to present conditions than when stretched too far into speculation about factors remote in place and time.

In the actual development of soundly adjusted personality, the learner and teacher together have to make judgments, based upon the past and present, as to which experimental changes in conditions are most likely to lead toward reduced withdrawal and a more complete facing of reality in the future. Since facing reality honestly and vigilantly is a contagious emotional attitude as well as an intellectual process of sensitive perception, teachers have the additional responsibility of setting an example of minimum withdrawal and maximum facing of the stern realities involved in guiding all the youth of the community.

Substitution as a pseudo-adjustment

Among the other ways in which school learners and even their adult parents and teachers endeavor to escape from the harder realities of life is the mechanism of substituting one goal for another. Clinical psychology offers two forms of substitution: compensation and sublimation. Under "compensation" are usually gathered those cases where the individual attempts to cover up his weakness in one area by exhibiting his strength in another. For example, the ten-year-old who is weak in arithmetic may be strong in annoying the fourth-grade teacher. In contrast, "sublimation" has been restricted by most psychologists to the behavior of adolescents. The high-school boy or girl is supposed to redirect his or her developing sexual impulses into activities that are nonsexual and acceptable to their elders. Through considering these two forms of substitution in relation to each other, the general implications for teaching practice may become clearer than when "compensation" and "sublimation" are treated as distinct psychic mechanisms. The question is whether the avoidance of a real goal in education and life by substituting another objective is a necessary and temporary pseudo-adjustment that actually may lead on to healthy adjustment and further development of the school learner.

Compensation is a concept that may be very helpful to a teacher who is annoyed by the misbehavior of a pupil. Instead of quickly concluding that the girl or boy has inherited evil tendencies either as a phase of universal "human nature" reputed to be naturally sinful, or through a particularly bad biological inheritance from degenerate parents, or by disruptive habits instilled by his low-class family, the teacher may be encouraged to spend a bit of time searching for the frustration that is driving the learner toward compensating acts. The youngster himself, in the typical case of compensation, does not realize that his drive for status among his classmates underlies his search for a conspicuous accomplishment. A set of conditions inside and outside the school may be contributing to the learner's personal difficulties. and the teacher's realization of the possibilities of the compensatory twist in motive offers an approach to a revealing inquiry. What are the capabilities of the boy or girl? How does the family discourage or overstimulate study? Should the school adjust its requirements to the learner or show the learner how to adjust effectively to the curriculum, or a combination of both? Should more recognition be given to the learner's success in one field and fewer rebukes be given for weakness elsewhere? Isn't some behavior bordering on compensation actually an asset in the lives of learners and their teachers as well, since few of us are strong in every field of endeavor? Are teachers sufficiently alert to the dangers of a learner's overcompensation for physical or social inferiority by a narrow devotion to those aspects of school studies that promise to bring high marks from the teacher? Whether or not compensating activity is helpful or harmful depends partly upon the degree of awareness or unawareness of the process by the person himself, and partly upon the indications that it is promoting or retarding further development in other areas of education and of life generally.

Sublimation is widely regarded as a behavioral adjustment that is essential and therefore beneficial to the adolescent of high-school age. This attitude seems sound, for example, in the case of the substitution of such adult-sanctioned behavior as social dancing in the home or school (under sympathetic supervision) for nonsanctioned sexual behavior. As has been said elsewhere, "The advocates of such substitutes maintain that adolescents have their sex impulses directed, without being aware of the process, so that the teachings of social control will be adequate."[12] Since these supposedly subtle methods do not always achieve their intended objective, as indicated by the amount of sexual activity really occurring among young people, high-school teachers may well reserve judgment concerning the all-round effectiveness of such substitution. Instead of advocating self-deceptive devices characterized by unawareness, a program of worth-while social activities may be developed with awareness of its limitations as well as its values. Actually, many adolescent groups have learned to regulate their own social behavior, for example, in regard to "petting." These adolescents are thus showing their own maturity in terms of facing the realities of life, so that more and more their parents and teachers may see how to share with youth the responsibilities of social conduct on a basis of self-discipline.

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[12] Bruce and Holden, *op. cit.*, p. 160.

In the discussion of these two substitution devices, compensation and sublimation, perhaps it has become evident that when learners and their teachers mutually understand the purpose of a limited degree of substitution of a new objective for a related responsibility, favorable development of personality may eventuate. This understanding or awareness of the character of the substitution process tends to remove its aspect of unconscious avoidance of reality (against which clinical study of the maladjusted adult has warned) and brings it out into the very midst of educational and social realities. There appears to be, in the case of normal learners, a possibility of a continuum of change in behavior and thought, by which a person may advance from unawareness toward awareness, from the avoidance of reality to a firm grasping of the pertinent conditions as they really exist. A favorable prospect may be detected by turning the psychic mechanism *other side up.*

Briefly, let us try to turn our list of pseudo-adjustments "other side up." "Daydreaming" may be translated into rational planning for the future. "Regression" may be transformed into adjusting one's objectives to one's capabilities, even though at times one's sights may be temporarily lowered. Just as the bar for the high jumper must be set by trial within his range as a preliminary to raising it to his best effort, so the learner and the teacher may set goals appropriately without being dominated by "regressive" attitudes. Even "negativism" may serve to remind us that there are times when it is healthy to say firmly, "No!" "Insulation" may be reinterpreted as the "need for privacy," identified by Maslow[13] in his significant study of psychological health. There Maslow points out that "self-actualizing people," who exhibit a high degree of adjustment as a group, are characterized by "a quality of detachment" to the extent of enjoying time to listen to music, think, and commune with oneself. Although such withdrawal into one's private spot may be mistaken, even by one's friends, for "insulation," it actually contributes greatly to a person's social adjustment when consciously planned as one aspect of a total life. Likewise, "repression" may suggest a reasonable control of one's speech and thought by consideration of the relations of the self to others rather than continuing as a deep hiding of one's shameful thoughts and guilt-producing memories below the level of awareness. Finally, "identification" with another person can be freed from its narrowing, emotionalized copying, which weakens the individual's responsibility for his self-development, as this deep regard may be transformed into an intelligent selection of the most worthy qualities of the person, with whom one has been tempted to "identify." Thus, we draw from a friendship general ideals without binding ourself blindly to one particular style of life.

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[13] A. H. Maslow, "Self-actualizing People: A Study of Psychological Health," chap. XIV in C. E. Moustakas (ed.), *The Self: Explorations in Personal Growth* (New York: Harper & Brothers, 1956).

Thus, all the psychic mechanisms mentioned may serve as warnings to the teacher of pseudo-adjustments to be avoided. The harm lies in the blind way in which their victims misapply them; however, they may contain hints for positive, intelligent adjustment. As every legitimate coin has a head and a tail, so every maladjustment can be turned other side up, not by a chance throw, but by a thoughtful re-evaluation based upon studies of the negative consequences of drifting into psychic twists and upon consideration of the positive ideals of personality development in our democratically oriented society.

Other devices that "protect" the personality

Among the other deceptive devices supposed to protect the self, or the ego, we select for consideration three more of the psychic mechanisms identified in the psychological clinic: projection, compartmentalization, and rationalization. In addition to looking at the dangers to healthy adjustment these devices represent in the lives of learners, we may be able to see how three corresponding aspects of personality development may be fostered in the school.

Projection can be contrasted with "identification" to the degree that the latter implies a "pulling in" to the self of the desires and motives of another person whom one admires. "Projection" is a tendency to "push out" upon another person one's own unrealized, frustrated ambitions, or to attribute to another one's own faults. For example, school learners are often the victims of their parents' projection of their former hopes for higher education and higher social status. The damage does not come from a father's hope that his son may have wider opportunities in life than he himself enjoyed, but from a blind drive toward a particular professional goal that may fit neither the son's interests and capacities nor the real opportunities of the current scene. Thus, the adjustment of the son to today's conditions is menaced by the father's "projection" of an adjustment suitable only to an earlier decade. Likewise, a teacher sometimes projects upon a favorite pupil an ambition that properly belongs to the teacher himself. Instead of doing the preferred pupil a favor, the teacher may thus, without being aware of the underlying, long hidden impulse, mislead the learner when giving educational and vocational guidance. In general, the adult guide may well pay as close attention to his own tendencies to project or use any other deceptive mechanism as to the learner's inclination to fall into projection, identification, or other psychic traps.

As far as the learner himself is concerned, "projection" sometimes takes the form of assuming that one's own motives, especially the lower, less generous sort, are the impelling forces in the lives of his peers. This process of attributing one's worst motives to the other fellow was almost reversed in a study by Wright[14] of eight-year-old boys and girls. Perhaps because they had not yet learned the ways of many adults, these third-graders attributed to their peers motivation by generosity *in the same degree* as themselves. Although it may be naive to attribute to others without discrimination the same motives as ourselves, it is a better basis for social adjustment in a group than ascribing to our fellows our own worst motives. When projection is considered as the establishment of intimate relations with others, it can be transformed into sympathetic understanding of one's associates, or even further into the "Golden Rule" of putting oneself actually in the place of the other person. The sensitive intelligence and human warmth consistent with the application of the Golden Rule contrast sharply with the unseeing projection of one's less commendable attributes upon others. Unless the projection tendency is reversed during the school years by guidance in fair, realistic treatment of one's associates, the coming generation is likely to still be filled with adults who continue to act and live in the obscurities of projective behavior.

Compartmentalization is a device by which the human being in today's complex world attempts to simplify his problems by dividing his life into separate parts or tight compartments. In learners this may take the form of having one pattern of life at school and another at home. Some children adopt a relatively mature way of behaving at school, while they reserve their "babyishness" for their family. The duty for the teacher is to try to help the learner make adjustments that carry through life as a whole. It is evident that in a matter as fundamental as personality adjustment, little can be accomplished unless home and school cooperate. Effective cooperation can be based only on a degree of mutual understanding. In a sense this means that teachers who are seeking to free their pupils from the grip of psychic mechanisms, such as compartmentalization, projection, identification, and all the rest, may find that one avenue lies in conferences with parents. Together, helpful methods of guidance may develop, and the teacher may take some leadership in pointing out ways of avoiding misleading devices and finding paths toward adequate adjustment for the boy or girl under consideration.

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[14] B. Wright, "Altruism in Children and the Perceived Conduct of Others," *Journal of Abnormal and Social Psychology*, XXXVII (1942), 218–233.

Although not all teachers will care to delve into the deeper problems of compartmentalization such as Thayer [15] finds involved in the separation of state and church, nor the philosophic cleavages in our culture depicted by Bode and others,[16] every teacher can find ways of unifying his own life and of helping learners and their parents to unify theirs in the daily life of the school and community. Compartmentalization may serve here to call attention to the pervasive operation of maladjustment by misleading mechanisms operating throughout the community at every age level, and to the long history of such human misconceptions, some of which are peculiar to the Western world. Whether the learner and his teacher are aware of its insidious presence, compartmentalization is a persistent threat to the healthy, wholesome, unified life. What is needed is a clear recognition of the diversity of behavior appropriate for home, school, church, and vocation. Such adjustment to diverse situations can be made, however, in ways by which these several phases of life are related constructively, rather than destructively broken into separate bits by tight traditions.

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[15] V. T. Thayer, *The Attack upon the American Secular School* (Boston: The Beacon Press, 1951); see also, by the same author, *Public Education and Its Critics* (New York: The Macmillan Company, 1954).

[16] See chapter by B. H. Bode in F. Burkhardt (ed.), *The Cleavage in Our Culture: Studies in Scientific Humanism in Honor of Max Otto* (Boston: The Beacon Press, 1952).

Rationalization is an all-inclusive psychological term under which might be included many of the devices already mentioned. In rationalizing one devises ostensible reasons to justify an act, opinion, or attitude that is actually based upon other reasons or motives. The rationalizer is typically not aware that he is putting forth "good" reasons and suppressing the real reasons for his behavior. Rationalization may be distinguished from genuinely reflective thinking by the way in which suggestions are treated. Instead of pursuing alternative suggestions through a substantial period of consideration,[17] an inappropriate suggestion is quickly accepted under emotional motivation as the final solution. Then only the evidence favoring the preselected solution is gathered. This biased process is often further favored by binding together firmly all the arguments on the side selected to be "proven" and then throwing their combined force against each opposition argument, one at a time. This discounting of each element of the opposition argument is known as giving the *segregative* treatment to the side against which one is prejudiced. On the other hand, the *cumulative* organization of each side is the method of rational reflective thinking. In projecting blame upon others and in using other devices for proteaching the ego, much rationalization supported by cumulative-segregative bias enters without awareness upon the part of the person who deceives himself into believing he is adjusting to the real situation.

Through their endeavors to help learners make their personal adjustments, teachers are incorporating in their educative programs a major responsibility. Whether or not teachers deal courageously and intelligently with these vital problems of personal development, the problems exist and continually affect the learning process. Maladjustment and the employment of psychological devices are almost as prevalent as human emotion, and who can find or would want to teach a girl or boy who had no emotions? The more seriously teachers consider their responsibilities for promoting intellectual development, the more attention they will pay to the underlying personality structure and its dynamic operation. This brief survey of some of the mechanisms that mislead both school learners and their adult parents and teachers now becomes a basis for the consideration of a positive educational program. We seek a program that will promote more adequate adjustment by all concerned in the work of the school.

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[17] L. E. Cole and W. F. Bruce, *Educational Psychology* (2nd ed.; Yonkers, N. Y.: World Book Company, 1958), chap. 13.

Security for learners in an age of anxiety

Fundamental to healthy personal development is a feeling of security. It is essential, therefore, that the school program promote feelings of security rather than of anxiety or worry in the learner; nor should the learners' worries be transferred to their teachers. Teachers, parents, and school-age learners all need a sense of security as they work together. To the degree that anxiety can be reduced, any person is less likely to resort to the misleading mechanisms discussed above. We seek conditions in which the facing of reality is supported by a sense of personal security.

How can the school promote, in all the people connected with it, a sense of security in these days, which can be characterized as "an age of anxiety" as realistically now as when the John Dewey Society so titled their 1953 *Yearbook?*[18] How can the school promote the freedom in education that the *Yearbook* recommends and also maintain a substantial degree of emotional security? How can one be both secure and realistic in times when the fear of political tension abroad and of economic and social tension within the United States makes the news headlines a daily threat to a sense of security? Insofar as we are correct in the identification of adequate adjustment and mental health with the facing of reality, the school dare not ignore the forces in the world and in the local community that really worry thoughtful persons, young and old. The modern school is too vital a part of society to function in isolation, to adopt the mechanism of insulation, or of compartmentalization. The school is dodging its responsibility if it builds a fantasy world in which learners are encouraged to daydream about a peaceful future in a world actually divided. No, the school must begin by accepting the current worries of the political, economic, social, and racial frontiers, as well as by developing resources of personal security as it makes its contribution to adjustment.

Obstacles to security in the school

This promotion of security for a complex personality—the school learner living in the midst of an insecure world—is no simple matter.

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[18] H. G. Hullfish (ed.), *Educational Freedom in an Age of Anxiety* (New York: Harper & Brothers, 1953).

Consider a positive statement of this broad program for the school as put by Carolyn Tryon: "Thus the conditions of good mental health require that the school create a situation for *all-day-long* where good human relations between child and child and between teacher and child can flourish."[19] Notice that one condition of "good mental health," or adequate adjustment, is the sense of personal security in the school group with which we are here concerned; nor is this healthy emotional climate confined to a single class period in "personality development" but an "all-day-long" condition in which the security is promoted largely by mutual support between each learner and his peers and his teacher. Even the teacher is assumed to be freed from worry, although in many classrooms certain boys and girls are a major source of worry to their teachers. How can a shift be made from worried learners and worried teachers to an atmosphere characterized by both freedom and security? Certainly "it takes time"[20] to learn to manage a school such that life in it is characterized by spontaneity, by genuine interest, by diligent effort, by good human relations between learner and learner, and learner and teacher. What are some of the major obstacles to be overcome in moving toward better mental health, greater security in freedom, more courageous facing of reality, more adequate adjustment, greater democracy, or whatever phrase the reader prefers for this many faceted ideal?

The school mark is one obstacle that tends to separate teacher from learner, and learner from learner. However, some way of marking, grading, and evaluating the pupil's school work seems necessary. The learner, though, is apt to be thrown out of democratic social adjustment to his teacher and classmates by any mark, high, low, or medium. The high mark may be related to undue subservience to teachers' requirements or to exaggerated feelings of superiority over his peers. The low mark may lead to feelings of inferiority and to evasive excuses employing the mechanisms of psychic maladjustment. Even the medium mark may not be a guarantee of security or healthy attitudes toward classmates and teachers. In spite of the long persisting criticism of school marks [21] for unreliability as well as adverse emotional effects upon learners and teachers, we recognize the practical reality of certain contributions of school marks in deciding about promotion in a graded school system, in transferring pupils from school to school, in informing parents and pupils of scholastic progress, and in promoting the individual learner's own *realistic* conception of himself. Inasmuch as the substitution of other methods of reporting progress and of reconstructing the graded school are affairs that take much time, the teacher has the immediate and difficult task of promoting better human relations in the face of a school-marking reality that learners and teachers must accept more or less gracefully. Such acceptance does not mean, however, a kind of soft adjustment that discourages efforts to improve the process of evaluation in the school. Although it is a long road from an overemphasis upon competition among pupils to fuller understanding of cooperation within a study group, many a class, under skillful teacher leadership, has made substantial progress in a single year. When a school system devotes its twelve-year opportunity to making adjustment in this crucial area a central concern of its parent-teacher, teacher-learner, and learner-learner personal relations, greater freedom and greater security can develop consistently.

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[19] C. Tryon. "Some Conditions of Good Mental Health," chap. 1 in *Fostering Mental Health in Our Schools*, 1950 Yearbook (Washington, D. C.: Association for Supervision and Curriculum Development, National Education Association. 1950), p. 12.

[20] M. I. Rasey, *It Takes Time: An Autobiography of the Teaching Profession* (New York: Harper & Brothers, 1953).

Teacher anxiety is another obstacle to learner security. From the days of infancy throughout life, anxiety is contagious. As Harry Stack Sullivan, out of his long experience as a psychiatrist, has reported: "The tension of anxiety, when present in the mothering one, induces anxiety in the infant." [22] To what degree this inducing of anxiety in a learner by a teacher occurs depends partly upon the intimacy of their contact. Certainly, the personally secure teacher, as leader of the class, imparts to all the members of the group, in many subtle ways, the freedom from anxiety that is his. Furthermore, the teacher who is free from worry is free to think clearly in planning the daily program of learning and to adjust to the vicissitudes that occur each day.

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[21] W. F. Bruce, *Principles of Democratic Education* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1939), chap. III, "Confusion over School Marks."

C. L. Drawhorne, "Relationship between Pupil and Student-Teacher Interaction and Pupil Ratings of Teacher Effectiveness," *Educational Administration and Supervision* XL, No. 5 (1954), 283–296.

S. T. Hadley, "A School Mark—Fact or Fancy?" *Educational Administration and Supervision*, XL, No. 5 (1954), 305–312.

[22] H. S. Sullivan, *The Interpersonal Theory of Psychiatry* (New York: W. W. Norton & Company, Inc., 1953), p. 41.

Whereas the reduction of worry in any teacher's life is a very personal problem and in meeting it the teacher may well seek out his own sources of help among friends and counselors, two areas of worry related to the school itself may be mentioned. As has been pointed out, "Too often a teacher's anxiety is increased rather than relieved by careless use of *ill-founded general terms*, such as 'creativeness,' 'guidance,' 'supervision,' 'social class,' and even 'democracy.'"[23] When we add to this list "security" and "adjustment," then we are bound by our further statement to do something toward "more specific defining of these words as each is used in a particular context." In this effort, we enlist the aid of the student of education, the reader, who may be able to interpret the limited suggestions of this discussion in ways applicable to his own problems of security—outside of as well as within the school. The defining of "security-adjustment" is an unending task, about which this whole chapter is concerned.

Misbehavior of a few girls or boys in the class is often a major source of teacher anxiety. "If I could only get rid of those pests," many a teacher has despairingly exclaimed, "all my worries would be over." This kind of worry is no longer relieved easily by wielding any kind of hickory stick. Today, the teacher's anxiety is increased by an annoying conflict between two desires or responsibilities. For example, teachers feel responsibility for maintaining discipline, but they have an opposing desire to be popular with their pupils. The cumulative effect of this anxiety-producing conflict has been emphasized in a study of the central anxieties of beginning teachers by Travers and his associates.[24] The authors of this report believe that such opposing desires are apt to produce increasing emotional tension, "since whatever action is likely to relieve one is likely to accentuate the other." The teacher is being squeezed between two apparently opposing social forces, which he has incorporated into his single personality or self. Out of the past, and, indeed, out of any clear recognition of the full meaning of democracy as a protection of the group, comes the demand for social order, for discipline of the individual when he trespasses upon the rights of his fellows. In school situations, the right of each learner to an education must be protected from disruption by one or two unruly class members. On the other hand, out of a current trend among middle-class Americans, the typical teacher is being forced, without any clear awareness on his part, into becoming an "other-directed" person,[25] that is, a person who is guided more and more by the views of others. Thus, a teacher's feelings about being popular with parents and pupils may have deep, partially concealed cultural sources. As relief from this conflict, there are two related possibilities. One source of help lies in teachers gaining greater awareness of the sources of conflict within themselves; the other is through teachers learning more about the motives underlying the misbehavior of learners. If this referring of teachers' and learners' adjustment problems back to a study of the personalities of learners and teachers seems like circular thinking, we may remind ourselves that the road to adjustment is a complex day-long and yearlong process filled with dynamic interaction. Understanding of personalities, of ourselves and others, underlies adequate adjustment.

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[23] Bruce and Holden, *op. cit.*, p. 73.

[24] R. M. W. Travers, W. Rabinowitz, and E. Nemovicher, "The Anxieties of a Group of Student Teachers," *Educational Administration and Supervision*, XXXVIII, No. 6 (1952), 368–375.

Multiple causation means multiple remedy

The principle of multiple causation, of many factors contributing to a situation, suggests to the teacher that in the investigation of a learner's persistent misbehavior, the search is likely to reveal a number of underlying unfavorable factors. Although some particular event may be the "last straw" to precipitate rebellious action, this action is often a symptom of a network of culminating conditions. As Hymes says, progress in the teaching of discipline cannot be tied to "some one pet, personal method," but "you must determine the cause, and your action must be consistent with the cause." [26] Since the causes are multiple, the effective remedies are also likely to be multiple. The teacher may well search for causal facts in the school itself—its methods, curriculum, and regulations. Another good place to look is the peer group outside the classroom, because there occur jealousies and childish cruelties that are apt to be hidden in the teacher-supervised class group. Look also in the home, where relations with parents and siblings may undermine the disciplinary guidance of the school. Although reading about typical cases will help the teacher, he must be on guard against typing or classifying, as by saying: "That is just like my Bob," or "Exactly like my Betty," or "Now, I know just what to do." Rather than adopting too readily this attitude, the alert teacher reads between the lines of careful studies [27] to discover the multiple factors involved, and the multiple nature, and the uniqueness of the effective remedies employed. Thus, the multiple causation-multiple remedy principle again suggests the complexity of the process of adjustment, of teaching discipline so that it becomes self-discipline. This principle also suggests the many techniques that the able teacher can use in various combinations with judgment based upon real understanding of the underlying conditions.

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[25] D. Riesman, "Teachers Amid Changing Expectations," *Harvard Educational Review*, XXIV, No. 2 (1954), 106–117.

[26] J. L. Hymes, Jr., *Behavior and Misbehavior: A Teacher's Guide to Action* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1955), p. 140.

Teamwork in the school

Personal adjustment, we reiterate, takes time. Fortunately, the school has time: twelve years commonly from first grade to high-school graduation. Unfortunately, this continuity asset is not often used to the full. As Hymes [28] points out, teachers of succeeding grades of the elementary school often fail to share their understanding of particular individuals. Teachers in the diverse subjects of the high school seldom have or make opportunities to interchange their understandings except in the most crucial cases. When the school has a systematic plan for dealing with personal adjustment, then teachers and principal can work as a team. Closer connections between the elementary, junior high, and senior high schools so that they become better *articulated*, as John Dewey [29] long ago suggested, are still greatly needed today. In many schools the team may be strengthened by adding guidance workers, counselors, and school psychologists, and by using such facilities as community clinics. Broadly planned teamwork fits in with the broad character of the adjustment process. When teamwork in behalf of learners is organized with flexibility and human warmth, much valuable help may be given. Nevertheless, the leader of the team, as far as the adjustment of a particular learner is concerned, is still the class-group teacher.

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[27] R. J. Havighurst and H. Taba, *Adolescent Character and Personality* (New York: John Wiley & Sons, Inc., 1949).

C. V. Millard and J. W. M. Rothney, *The Elementary School: A Book of Cases* (New York: The Dryden Press, 1957).

D. A. Prescott, *The Child in the Educative Process* (New York: McGraw-Hill Book Company, Inc., 1957).

J. W. M. Rothney, *The High School Student: A Book of Cases* (New York: The Dryden Press, 1953).

[28] Hymes, *op. cit.*, p. 120.

[29] J. Dewey, "General Principles of Educational Articulation" (Address before Department of Superintendents, National Education Association, Official Report, 1929), pp. 51–60.

The teacher and the group

Fortunately, teachers deal with classes, the members of which may become related in an interacting, mutually adjusting group. The adjustment of any person involves centrally his adjustment to and with other human beings, his adjustment *in* a group. If schools were not organized into groups, they would not serve the full educational need of the individuals. The study of group dynamics now offers the teacher a number of techniques and understandings by which personal adjustment can be facilitated through the class group.[30] As the rapidly growing study of group dynamics becomes more closely integrated with the study of individual personality, a new and highly useful resource will become available to alert teachers and administrators. The teacher will find that, although individual counseling has its distinctive place in the development of adjustment between learner and teacher, very great possibilities lie in the human relationships of the class group under the guidance of a teacher who is also a student of group dynamics. Such an informed teacher will devise ways of grouping within his own class, and of dealing with the whole class as a group, that will not only increase effectiveness in subject learning but will multiply the opportunities for learning mutual adjustments of a social-emotional character.

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[30] See, for example:

K. Benne, "More Learning Takes Place," *NEA Journal* (Apr., 1954), 205–208.

——— and P. Sheats, "Functional Roles of Group Members," *Journal of Social Issues*, IV (Spring, 1948), 41–49.

G. E. Jensen, "School as a Social System," *Educational Research Bulletin*, XXXIII (1954), 38–46.

———, "The Social Structure of the Classroom Group: An Observational Framework," *Journal of Educational Psychology*, XLIV (1955), 362–374.

——— and M. R. Goodson, *The Formal Organization of School Systems* (Minneapolis: Burgess Publishing Company, 1956).

H. A. Thelen, "Educational Dynamics: Theory and Research," *The Journal of Social Issues*, VI (1950), 2–93.

———, "Group Dynamics in Instruction: Principle of Least Group Size," *The School Review*, LVII (Mar., 1949), 139–148.

Thus, the teacher may become a group hygienist who discovers how fully the tolerance and justice offered to individuals promote effective study and social stability in the group as a whole.

The teacher's own adjustment

Although the teacher's own personal adjustment is a lifelong process, with its unique turns for each individual, as has been stated elsewhere in detail,[31] its effects upon the adjustment of the learners can scarcely be overemphasized. A most cogent admonition is: "Be yourself!" In other words, each person, with whatever aid at hand, must work out his own adjustment in his own way. Being oneself, however, does not mean staying where one happens to be, in a particular month or year. When the teacher treats himself as *a member of the study group*, he will learn much about adjustment in the classroom. The teacher has other group resources, however, in his adult friends, in his professional associates, in his family, and in other groups. Balancing his thinking about his own personal development with substantial activity in groups where adjustments are learned in realistic situations, the teacher may thereby enhance the quality of his leadership toward personal adjustment. Our whole concern with learners' adjustment problems may be reflected in and promoted through the teacher's own developing self-adjustment. As the teacher learns, so will he teach.

QUESTIONS AND EXERCISES
for discussion and study

1 When a child shows an unusual amount of hostility and aggressiveness in the playground, what possible causal factors occur to you? What remedies do these causes suggest in terms of possible learning-teaching?

2 Describe a person of your acquaintance—school learner or older person—some aspect of whose behavior you think can best be explained as overcompensation for a feeling of inferiority. To what extent is such behavior helpful or harmful to this person? Suggest ways of shifting toward a more healthy attitude.

3 List the emotional attitudes that the average teacher may expect to have directed toward him as he meets a class for the first time. Which of these attitudes appear to be pseudo-adjustment of the learners' personalities? How can a teacher react to these attitudes constructively and avoid being worried by them?

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[31] Bruce and Holden, *op. cit.*

4 How does the teacher's own personality affect his way of dealing with the various attitudes of learners toward him? Consider the aggressive, fearful, and insecure, as well as the overprotective, attitude of teachers.

5 Describe an incident in your own life that caused you prolonged fear or worry owing to its unfortunate handling by your parent or teacher, and indicate how the incident could have been managed so that your fear or worry could have been much reduced.

6 What is meant by the principle of multiple causation? Give an illustration from the life of a learner you know, and an example from your own life. Indicate to what degree multiple remedy is suggested in each case.

7 What conditions in a school you know well tend to produce anxiety in the learners? In their teachers? To promote security in learners, and in teachers at the same time? What changes in school policy or practice do you suggest?

8 What psychic mechanisms do you find the learners you know best using for pseudo-adjustment most frequently? Make several suggestions for the transformation of each of these pseudo-adjustments toward healthy, adequate adjustment.

9 What clinical facilities are available in your community for the study and treatment of maladjusted school learners? Of maladjusted adults? For how many years have these clinics been running? To what extent has their work been expanding during that period? What prejudices, if any, interfere with the fuller use of these facilities by the school and by the community? To what extent are parents and teachers consulted by the clinicians when school learners are being studied? What changes are desirable from your standpoint in the relations of school and clinic?

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CHAPTER 6

Special learning and adjustment problems of handicapped children

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Extent of the problem

WHAT IS THE TOTAL NUMBER of deviating or atypical school children in the United States who require special educational adjustments to make the most of their potentials? No precise answer can be given to this question, because there has never been a nation-wide survey or even a satisfactory state-wide survey of children who can be regarded as deviating, atypical, or abnormal in physical, mental, educational, or social development. The incidence rates that have been proposed are estimates based on local surveys, usually city-wide investigations. Moreover, the local investigators have not always followed identical standards of diagnosis or uniform statistical definitions; the definitions have often been based on practical rather than scientific considerations. Furthermore, many degrees of perfection exist in practically all psychophysical traits. Trait gradations merge imperceptibly into one another with no discernible gaps at any point in the curve of variations. Thus, there is no sharp line between normal and deficient speech, or between mental subnormality and normality. Again, many categories of defects or anomalies do not represent simple, unitary, homogeneous entities. Thus, mental deficiency or retardation, cerebral palsy, or epilepsy represent highly complex, heterogeneous conditions of many degrees, types, and causes; physical, mental, social, and educational symptoms and consequences; and many treatment needs, rather than distinct nosological (classificatory) entities. It would indeed be more accurate to speak of the mental deficiencies, the epilepsies, and the cerebral palsies, rather than to speak of mental deficiency, epilepsy, and cerebral palsy.

Bearing these precautions in mind, three estimates may, nevertheless, be cited. The first was made in 1930 by the Committee on Special Classes of the White House Conference on Child Health and Protection.[1] The Committee found that there were "more than 3,000,000 children in the elementary schools of the United States who require special treatment and training," exclusive of the malnourished and those with heart damage. At that time fewer than 250,000 of all kinds of handicapped children, were registered in special schools or classes. In 1944, according to an Office of Education estimate, 12.75 per cent of all school children required special services because of various deviations. This figure includes: the gifted, 1 per cent; the mentally retarded, 3 per cent; the deaf and hard-of-hearing, 1.5 per cent; the blind and partially sighted, 0.25 per cent; those needing orthopedic care, 1 per cent; children with speech disability, 5 per cent; and those with special health problems, 1 per cent. The total number of such children would approximate 4,000,000.[2] In the period of 1952-53, 497,216 children in nine areas of deviation were receiving special educational adjustments in urban and rural public elementary and secondary schools, or almost 600,000, if the home-bound, hospitalized, institutionalized, and the socially maladjusted are included. This agrees with the estimate that only about 20 per cent of those in need of such services are receiving them.[3]

Deviates in need of specialized educational services: Children below normal in mental ability

A confusing number of terms have been applied to these children.

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[1] C. S. Berry (chm.), *Special Education, the Handicapped and the Gifted* (New York: Appleton-Century-Crofts, Inc., 1931), pp. 5, 7, 554.

[2] E. Martens, "Needs of Exceptional Children," *Office of Education Leaflet No. 74* (1944).

[3] "Statistics of Special Education for Exceptional Children, 1952–53," chap. 5 in *Biennial Survey of Education in the United States 1952–54*, pp. 3, 4, 15, 17.

In most frequent use at the present time are the terms "mentally retarded," "mentally deficient," "mentally handicapped," "slow learning," "backward," and "dull" or "dull normal." "Mental retardation" has recently been adopted by the American Association on Mental Deficiency as a generic term for mental deficiency.

Definition of mental retardation. "Mental Retardation refers to that group of conditions which is characterized by (1) Inadequate social adjustment; (2) Reduced capacity for learning; (3) Slow rate of maturation; present singly or in combination, due to a degree of intellectual functioning which is below the average range, and usually is present from birth or early age."[4]

There are many ways of classifying mental retardates: educational, psychological, medical, and sociological. Ultimately the diagnosis is based upon sociological functioning, that is, inadequate social behavior. But practical necessity makes it imperative to discover the condition at an early age—we cannot wait until the individual is an adult and then make a diagnosis of mental retardation based on observation of his inadequate social behavior. For this reason, diagnosis has been made through the use of the best predictive devices available, namelv, individually administered intelligence tests. From the results and observations an estimate as to the individual's future social behavior is presented. Thus, the predicted limits of the development of adult social behavior is made from the child's intelligence quotient. If the child earns a low IQ, it is estimated that his future social behavior will be grossly inadequate. If his IQ is relatively high, the prediction is that the adult social behavior will be more mature and complex.

Distribution of levels of retardation. On the basis of the standardization group consisting of 2,906 children, aged two to eighteen years, used in the 1937 Revision of the Stanford-Binet Scales, 2.6 per cent had a Binet IQ of less than 70 and 5.6 per cent ranked between 70 and 79, giving a total of 8.2 per cent under an IQ of 80; 14.5 per cent had IQ's between 80 and 89.[5]

Wechsler,[6] on the basis of the Wechsler-Bellevue Intelligence Scale and a "statistical concept of intelligence," classifies 2.2 per cent of people as "defectives," 6.7 per cent as "borderline," and 16.1 per cent as "dull normal."

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[4] *Statistical Manual of the American Association of Mental Deficiency* (4th ed.; Wakefield, Mass.: Item Press, 1957), part I, "Etiological Classification."

[5] M. A. Merrill, "The Significance of I.Q.'s on the Revised Stanford-Binet Scales," *Journal of Educational Psychology*, XXIX (Dec., 1938), 650.

[6] D. Wechsler, *The Measurement of Adult Intelligence* (Baltimore: Williams & Wilkins Company, 1944), p. 40.

These statistics have generally not been substantiated by clinical studies. Thus Wallin,[7] in his half-century of experience in examining children, reports only 1 per cent as defective and 3 to 5 per cent as borderline and very backward. It is this kind of clinical experience that accounts for the estimate of a minimum of 3 per cent of all school-age children who would need and be eligible for the special classes for the mentally retarded in the public schools.

Suggested terminology for grades of retardation. Unfortunately, the problem of terminology for different grades of retardation has not been the same for different groups interested in the mentally retarded. Medical personnel have been concerned over the causes (etiology) of the condition; psychologists, with behavior characteristics; educators, with learning characteristics; parents, with non-odious labels. Attempts have been made at obtaining satisfactory terms. For example, a committee of the American Association on Mental Deficiency has suggested the following classification as a substitute for the traditional idiot, imbecile, and moron categories: severely retarded, 0—25 IQ; moderately retarded. 25—50 IQ; and mildly retarded, 50—75 IQ.[8]

Although this is a loosely formulated and controversial classification, it does eliminate terms often found objectionable to the children and their parents. It does not help teachers, however. Kirk and Johnson[9] suggest the following classification: educable mentally handicapped, trainable mentally handicapped, and total care. This classification is closely correlated with intelligence quotients. IQ's of from 0 to about 25 are used to estimate an adult behavior so limited as to require total care. IQ's of 25 to about 50 estimate adult behavior, after training, of self-care, adequate social relations, and some economic usefulness, provided that intelligent, sympathetic supervision is present. IQ's of 50 to 75 or 80 are used to estimate an academic achievement appropriate to class placement of third- or fourth-grade level and independent adult behavior—vocationally, socially, and economically. This classification implies certain educational attempts: little or none for those needing total care, readiness activities for the trainable, and limited academics for the educable. This implicit goal-setting has been found by teachers to be quite helpful, thus accounting for the growing popularity of this classification in educational circles.

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[7] J. E. W. Wallin, *Education of Mentally Handicapped Children* (New York: Harper & Brothers, 1955), pp. 130, 132.

[8] W. Stern, "Progress Report of Special Committee on Nomenclature of the American Association on Mental Deficiency," *American Journal of Mental Deficiency* (Oct., 1954), 345–351.

[9] S. A. Kirk and G. O. Johnson, *Educating the Retarded Child* (Boston: Houghton Mifflin Company, 1951).

Typology. The heterogeneous group of the mentally retarded includes many types of varying levels of ability, such as the simple aclinical group and many clinical groups. The latter include mongols, cretins, phenylpyruvics, microcephalics, macrocephalics, hydrocephalics, epileptics, amaurotics, and paralytics. Although not all cases in these clincial categories are mentally subnormal, most of them are. Many of the clinical groups are of congenital origin, some stem from gene variations or mutations, and most of the others stem from prenatal and paranatal birth abnormalities.[10] The aclinical, simple, or subcultural cases are caused both by genetic and environmental factors, including an impoverished psychic environment. Heredity seems to play a more important role in the case of the higher grades, but just how much it contributes is not known.

Educational adjustments. In order to meet the needs of all types and levels of retardates, there must be available a comprehensive system of institutions, special schools, special classes, special sections, and adjustment procedures in the regular grades.

Prevalent practice places children with IQ's from about 25 or 30 to less than 50 in segregated classes for the "ineducables" or "trainables" and those from 50 to about 75 in classes for the "educables." The number of such "trainables" is roughly 1 to 2 per thousand school children, with educables usually 3 per hundred.[11] Such an arbitrary division should not be followed too rigorously. There is no sharp line of cleavage at IQ 50 between the trainable and the educable. There are all degrees of trainability and educability, with no sharp gap between. For example, some children with an IQ of 45 have been found to do as well in many activities as other children with an IQ of 50 or 55. A large, indeterminate borderline exists between categories. Furthermore, it is extremely hazardous to predict future adult dependence or independence from a child's performance on an intelligence test. The important thing is to adjust a varied developmental, corrective, and therapeutic program of activities to the child's specific needs. These can be determined by the case-study and follow-up procedures for the best grouping possible, with continued re-evaluation over a period of time.

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[10] J. E. W. Wallin, *Mental Deficiency* (Brandon, Vt.: Frederick C. Thorne, *Journal of Clinical Psychology*, 1956), pp. 26–76, 129ff.

[11] *Report on Study Projects for Trainable Mentally Handicapped Children*, issued by V. L. Nickell, Superintendent of Public Instruction, State of Illinois, November 1, 1954.

Programs. Implicit in the classifications is the educational goal for each group of mentally retarded children. Thus, trainability implies improvement in the skills of self-care, socialization, and economic usefulness under sympathetic, protective supervision. All activities are in these directions. For example, practice in dressing and undressing, table manners, toilet habits, and care of possessions and clothes are a part of the curriculum for teaching trainables the skills of self-care. Socialization training is sought through the use of cooperative games, group planning, field trips, study projects, and the teaching of specific courtesy behavior. Handcrafts and housekeeping chores become the medium for developing habits of responsibility and effort, while physical activities of all kinds train muscular and sensory discriminations and skills. Ultimately, these will be the basic ingredients of useful, uncomplicated work in the home, an institution, or a sheltered workshop.

Educability implies the possibility of developing some degree of independent behavior by careful training. The program therefore is more inclusive and penetrating than that designed for trainables. Indeed, the teachers of educable mentally retarded children in the state of Illinois, for example, have developed a curriculum based on persistent life-problems in the following areas:

1. Physical and mental health, which stresses habits of nutrition, cleanliness, and rest, as well as realistic self-appraisal
2. Safety, teaching rules of conduct, and first aid
3. Skills of listening, observing, speaking, and writing
4. Home and family responsibility involving both membership activities and operations
5. Local-travel skills
6. Passive and active recreation
7. Interpersonal and group socialization skills
8. Concepts of value and management of materials, money, and time

9. Habits of work, responsibility, and getting along with peers and supervisors
10. Habits of value and choice judgments

These problems are presumed to be among the more important ones that will face these retarded children all their lives. The programs stress each area as it is appropriate to the child's level of development. Thus, at the primary level it seems important to concentrate on sensory and muscular improvement. At the elementary levels, emphasis is on learning academic tools, whereas in junior and senior high-school classes, vocational problems and practice are stressed. The guide, however, is the curriculum outline with its specific problem areas.

The characteristics of mental retardation provide the clues for procedures to be followed. From many sources there seems to be agreement that the mentally retarded generally:

1. Show poor powers of generalization. They have difficulty in applying to a new situation what has previously been learned.
2. Have specific, concrete reactions. Value judgments tend to be absolute. Circumstances do not seem to be taken into account in deciding issues. Thus, it may be wrong to steal money, but perfectly correct to steal food or other articles.
3. Are quite egocentric. They seem not to recognize that the Golden Rule works two ways.
4. Develop bizarre cause and effect ideas. It is not uncommon to find them blaming the thermometer for their illnesses.
5. Integrate poorly. They do not seem to be able to fit parts into a unified whole, as in the case of specific weather events being related to climate.
6. Learn slowly, inefficiently, and ineffectually.

Such characteristics form the basis for specific techniques of teaching these youngsters. In the total task of teaching for independent adult behavior, the teacher may make use of a curriculum of life-problems and teach by using methods that stress concrete rather than abstract items, by utilizing a variety of drill techniques, by training habits of integration and generalization, and by concentrating on teaching relationships, both personal and material. It is a nonacademic program. Perhaps one reason that teachers who try to adapt their usual classroom procedures to meet the needs of slow students in their classes are not very successful is that the nature of the program is nonacademic. It is easy to provide drill, concrete examples, and to teach relationships, but difficult to present a nonacademic, vocationally orientated program in an academic atmosphere.

Some things may be done, however. The best single index to the level at which an individual can be expected to achieve is the mental age.[12] If a child has a mental age of about 8 years, he may be expected to do about third-grade work.[13] It matters not whether he is 6, 8, 10, 12, or some other number of months and years of chronological age. The expectation of achievement level is still primarily dependent on his mental age. It is not uncommon to find teachers spending much time and effort in trying to get pupils to achieve at their grade placement or chronological age level. Such efforts are frustrating to both the teacher and the pupil. If a child is 10 years of age and in the fifth grade, reads at a second-grade level, and has a mental age of 7 or 7½, he is doing as well as may be expected. Extra teaching effort is not going to result in much improvement. The teacher should accept this performance as reasonable and should not torture himself and the child with efforts calculated to "bring the child up to the level of the rest of the class." In addition to realistic academic goals, much may be gained from an honest interpretation of the child's abilities to his parents. They, too, need to adjust their expectations mostly to the mental age and less to the chronological age. School work should be oriented toward mental age. Reading, spelling, arithmetic, social studies, and science are intimately related in the learning process. The teacher should expect a lower level of pupil achievement in all of these subjects and make adequate provision of materials for each.

Since vocational competence is the ultimate goal for the mentally retarded child, a wise teacher starts early to teach honesty, punctuality, responsibility, and getting along with peers and with those in authority. These are the traits, habits, and attitudes that make the difference between future vocational success or failure. Although these behavior patterns are often learned incidentally by children of normal intelligence, it is especially imperative that the learning of these traits and virtues should never be left to chance in the case of the mentally retarded. In fact, the development of these qualities should be included in planned programs for all children.

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[12] O. P. Kolstoe, "A Comparison of Mental Abilities of Bright and Dull Children of Comparable Mental Ages," *Journal of Educational Psychology*, XLV, No. 3 (Mar., 1954).

[13] Some children having a mental age of 5 may learn to read better than some other children having a mental age of 6 or 7. Achievement or performance depends on many factors of which intelligence is only one. In addition to knowing the mental age, the teacher should also be aware of the predictive value of the IQ. A child of 5 with a mental age of 6 is quite a different educational problem from a child of 8 with a mental age of 6. The length of time that the child has spent in school cannot be completely ignored. Although it may be only a minor factor, it should be considered with all other factors in any over-all evaluation.

Difficult behavior cases

There is growing concern with the reported mounting incidence of juvenile behavior disorders and delinquency. According to the Government's "Uniform Crime Reports," 2,563,150 major crimes were committed throughout the country in 1956, 46 per cent of which were among juveniles under eighteen years of age. The increase in such crimes between 1950 and 1956 was four times as great as the increase in the general population. The increase of crimes among juveniles was 17.3 per cent in 1956 over 1955, although the population increase for children of ages ten to seventeen for that period was only 3 per cent. The number of children in school who are classed as socially maladjusted or as presenting conduct disorders has usually been placed at 2 to 3 per cent. The estimate at the present time would probably run higher. Obviously, the schools must be vitally interested in this large segment of the school population that creates for society its most difficult problems in human engineering and control.

There are many varieties and degrees of aberrant behavior or social nonconformity, and personality maladjustments related to this behavior, either as cause or effect. These vary from trivial annoyances or mischief-making to gross behavior disturbances and uncontrollable outbursts of temper or rage. Causes of deviant behavior range from severe internal emotional tensions or irritations, inherent in the personality structure and the psychophysical organism, to emotional or social rebellion provoked by intolerable home, neighborhood, and school conditions. Much disagreement exists as to both cause and cure. Certainly the enforced unemployment status of adolescents is of major concern. Compulsory attendance laws require young people to remain in school until the age of sixteen or eighteen. Legal maturity for boys is denied until an age of twenty-one is reached. Many employers are reluctant to entrust minors with responsible positions. These factors, coupled with the minimal demands for family maintenance in our urban society, have created a group of young citizens who are dependent on adults for their food and shelter and, while physically and perhaps emotionally and intellectually capable of gainful employment, must remain either unemployed, in school, or employed at low-level tasks until they reach legal maturity. Social unrest is the mildest result to be expected. When account is taken of the increasing incidence of young people of low academic aptitude who are required to be in schools that offer little other than academics, the problems are seen to accumulate. Family neglect or viciousness, along with neighborhood poverty, adds to the emotional turmoil of these youngsters. The composite is not a cheerful picture; human waste is not pretty.

The school alone cannot solve this highly complex social problem, but it can make a solid contribution along preventive and remedial lines. Most behavior deviates, if treated early, will respond to effectively adapted instruction and psychotherapy, supplemented by medical treatment as required. The basic requirement is to ferret out the endogenous, or internal, and the exogenous, or external, irritants that cause the social, educational, and personality maladjustments, and to remove or mitigate the causes found.

Certain behaviors characteristic of anxiety are readily discernible in the classroom. Children troubled by anxiety frequently appear lazy or indifferent and dislike school. They are apt to be absent frequently. They may have nervous habits, such as nail-biting or deep and frequent sighing. They are often unhappy and frequently violent, jealous, or overcompetitive. They are often isolated by other children. Any or all of these behaviors may indicate the basic, persistent tensions of emotional conflict.

The characteristics exhibited by youngsters with good mental health are well known.[14] These include:

1. Being generally happy in spite of their shortcomings
2. Being reasonably independent in actions and decisions
3. Self-confidence
4. Being fairly relaxed and at ease with themselves and others
5. An awareness or sensitivity to the feelings of others
6. Eager attention to new tasks

To help all their pupils to achieve these behaviors should be the goal for teachers. When a teacher tries to help one of these unhappy pupils, a usual first step is a conference of all the teachers who come in contact with the child, to pool ideas as to the causes of his unhappiness. Those that are school-engendered can be attacked by modifying the class environment. This includes providing expectations based on the child's ability. If he has the mental ability of a first-grade pupil, first-grade level work should be provided. However, chronological age and actual grade placement are other factors that often need to be considered.

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[14] See J. E. W. Wallin, *Personality Maladjustments and Mental Hygiene* (2nd ed.; New York: McGraw-Hill Book Company, Inc., 1949), pp. 35–44.

Acceptance by his peers is paramount. When the child is given tasks of a nature that contribute to the welfare of all, he may become better accepted. If his personal habits are annoying to other pupils, a frank discussion can bring these habits to his attention. If it seems important to enlist the aid of parents, a home visit may be indicated. This should be of an information-gathering nature—the teacher says that Johnny is unhappy in school and asks the parents if they know why, and what suggestions they might have that could help the teacher make Johnny feel less hurt.

Professional school workers are sometimes available. Usually a school social worker or visiting counselor has both the skill and the responsibility to work with the child, the home, and the teacher in effecting a reconstruction of his total environment. Clinical psychologists, school psychologists, or psychiatrists may be needed to help the child restructure his psychic life. These are tasks for well-trained specialists. The teacher should refer, cooperate, and encourage. Although the teacher should not play the role of psychologist, psychiatrist, or psychotherapist, he should apply the principles of mental hygiene in all of his work.

Children with speech defects and impediments

The number of children in school with mild to severe speech disorders of various kinds will vary. conservatively, from 5 to 10 per cent, 2 or 3 per cent having severe involvements, symptomatically considered. No defect should be considered mild if it interferes with normal educational, emotional, social, or personality development. Speech is for communication. It is defective when it makes communication difficult or impossible.

What can the clasroom teacher do for milder cases? Can he prevent them? The types of disorders found in children are either those that have been learned, namely, functional articulatory, such as omissions, substitutions, slurring, and use of faulty vowels or consonants; or those with a pathological organic basis, such as a severe hearing loss, a cleft lip or palate, and muscle incoordination due to brain damage as in cerebral palsy; or induced emotional tension, as is often the case in stuttering or halting delivery. Although the incidence of speech defects is much greater among handicapped children, the large majority of defects are of a functional or learned nature.

The speech defective group was the largest group receiving special services in the public schools in the academic year of 1952-53: 306,747 as compared with 113,565 of the mentally retarded, the next largest group.[15] Therefore, the typical school is more apt to have speech correction than other kinds of special services. In the absence of speech correction services, the teacher may do some good work in speech correction if he bases his treatment on the cause of the speech defect. If the defect is organic, the child should be referred to the proper agency—medical clinic, services for the deaf, clinic for hearing evaluation, or services for crippled children. An adequately trained teacher, however, can handle many of the simple articulation types of speech cases. Teachers can be of great help in referring difficult cases to the proper specialist or authority.

Some of the suggestions in the preceding section are applicable to children whose speech defect seems to be emotionally based. Any defect, however, is apt to carry emotional overtones. It is important, therefore, to protect the child from being embarrassed by his difficulty in communication.

Functional speech problems result from learning either from a poor model or in an environment where speech errors were tolerated or ignored. The teacher must aid the child in discarding former, incorrect habits and learning new, correct ones. The task appears simple, but it is exceedingly complex. Often a child's whole value system is represented in his speech patterns. In other words, he may have learned to continue "baby talk" because his parents or some other authority responded to it and gave the child attention or affection, or made him feel important. If the child gives up this characteristic pattern, he may lose his sense of identity. Such a loss may not seem to be much of a bargain just to gain more normal speech. A skilled and well-trained team of speech correctionist, social worker, and school psychologist may be needed for effective treatment. In their absence, a teacher may still take some constructive measures.

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[15] "Statistics of Special Education for Exceptional Children, 1952–53," *op. cit.*, p. 19.

No child can learn to speak correctly unless someone demonstrates what good speech is. Thus, a teacher should be expected to speak correctly. His speech should set the standard for the class to follow. Next, the teacher must detect the errors made by his pupils and demonstrate by lip and tongue and breath control the correct production of the sounds. Several good books on this subject are available. The teacher should follow the instructions in these books carefully. Most important, the teacher should encourage all his pupils to talk and should try to create an atmosphere in which all are encouraged to improve, but where no one is ridiculed if he is not perfect. This procedure of demonstration and friendly persuasion is one that teachers can follow without actually trying to be a full-time speech correctionist.

The deaf and the hard-of-hearing

Many degrees of hearing impairment exist between total deafness and impairments barely discernible with the most sensitive individual audiometers. No sharp line of demarcation exists between the deaf and the not-deaf. Many of the deaf possess residual hearing that can be rendered functional through auditory training. Owing to the fact that about 20 per cent of children sent to residential schools for the deaf are hard of hearing rather than deaf, some authorities have suggested classifying hearing impairments into the following categories: (a) mild to moderate, to cover losses from 30—40 decibels or units of hearing loss as determined by the individual speech audiometer; (b) moderate to severe, with a shortage of 40—70 decibels; and (c) profound, with a shortage of over 70 decibels. Children who acquire severe hearing losses during the first few years of life will experience speech and language difficulties also, and can properly be classified as educationally deaf, although not organically deaf. From 35 to 40 per cent of deafness is of congenital origin, from gene deviations or pregnancy complications. The other cases develop after birth, usually during childhood, from nose and throat infections derived from colds, influenza, measles, whooping cough, scarlet fever, and meningitis. Such infections often spread through the Eustachian tubes to the middle ear and produce "conductive" hearing impairment. Most cases of hearing impairment in children stem from otitis media.

The number of deaf children and adults in 1953 was estimated to be about 200,000. The number of children in schools and classes for the deaf, public and private, throughout the country in 1956 was 23,462, of whom 112 were also handicapped with blindness or cerebral palsy. The number of hard-of-hearing school children depends largely on the audiometric standards in vogue. A conservative estimate based on many audiometric surveys would place the number at 5 per cent, and at least 10 per cent if the acute and seasonal cases are included. The country-wide estimate of children with slight impairment has varied from 1½ to 2 million, and of those with seriously handicapping losses from .5 to 1 per cent of the child population.

Notable advances have been scored in the field of audition during recent decades, such as: (a) the invention of accurate instruments for measuring the amount and type of hearing impairment, especially the electronic audiometers; (b) the establishment of speech-hearing centers or audiology clinics, served by audiologists, otologists, psychologists, and speech therapists; (c) the improvement of group and individual hearing aids, especially the tubeless, transistor type among the latter; (d) the prevention or remediation of hearing impairment by effective, prompt medication—through the use of sulfonamides and antibiotics for middle-ear infection; (e) the enlargement of the oval opening in the inner wall of the middle ear to allow the stirrup to vibrate freely (the fenestra operation); and (f) the removal of Eustachian-tube blockage by surgery or irradiation.

Many cases of acquired hearing loss could be prevented by prompt medical treatment of nasopharyngeal infections. The accomplishments already made suggest that the schools' burden of providing corrective work for the deafened will be greatly reduced in the future.

Rehabilitative therapy for the deaf and hard-of-hearing. To live with people requires communication. This two-way interchange can be effective only if both parties understand each other. Since language is learned by the process of imitating sounds heard, it follows that the most crucial problem of the deaf is their language limitation. To teach language skills to children with a profound hearing loss requires exceedingly well-trained teachers. Unless special classes with good equipment and well-trained teachers are available in the public school, these children should be enrolled at the age of three or four in state residential schools for the deaf. Programs and curricula needed to teach language to deaf children are so highly specialized that a regular classroom teacher cannot make these adjustments. Special techniques in a special environment are needed. However, when a deaf child has learned language skills to a point where he can communicate with people with normal hearing, he may then be placed in a class, appropriate to his achievement, in the public school with normal peers.

For hard-of-hearing children some adjustments can be made. First, they should be fitted with hearing aids by an expert. Next, they must be given tutoring to learn to use the hearing aid. When this has been accomplished, they should be placed in the regular classroom. The teacher then has the job of letting the child sit where he can both see and hear best, and occasionally checking to see that his hearing aid is kept in good repair, that he wears it, and that he understands his assignments. These are common-sense procedures.

The personality characteristics that are often developed by deaf children are of more basic concern. One of the protective devices provided us by nature is hearing. We listen for sounds that signal safety, well-being, and danger. The denial of this sensory avenue for the interpretation of our environment is a threat to our security. Most studies of the personality of deaf and severely hard of hearing youngsters report maladjustment in their personal and interpersonal perceptions. In addition, these children are reported to be deficient in their perception of the world in general. Not many of the studies have been very rigorous in scientific design, yet the reports are well reinforced by clinical case-study data. Until otherwise demonstrated, these data must be accepted tentatively. Other than communication, the next major problem facing deaf children is that of their self-evaluation and acceptance. Teachers should be constantly on the alert to reinforce the child's concept of himself as an acceptable person. Given the skills of communication, adequate self-acceptance and subsequent satisfactory interpersonal relationships are the difference between productive and unproductive living.

The blind and the partially sighted

As in the case of deafness, blindess is not always total. Thus, almost 60 per cent of the estimated 320,000 blind in the United States in 1954 (of whom about 32,000 were under twenty years of age) had enough vision to distinguish between light and dark and to see the moving hand at a distance of one foot. They were diagnosed as blind because they had less than 20/200 vision in the better eye after correction and/or because they were severely handicapped by a restricted visual field. An index of 20/200 means that a large letter on the vision chart, which the normal eye perceives at 200 feet, can only be perceived at a distance of 20 feet. Such a degree of visual impairment is often referred to as economic or educational blindness.

About two-thirds of blindess in children is of prenatal origin, about 15 per cent of which seems to be due to gene variations. About 80 per cent develops prenatally and during the first five years. This group of the blinded possesses little usable visual imagery. The number of blind adults seems to be increasing because of the increase in the population and in longevity—about 50 per cent of blindness occurs among adults over sixty-five—whereas the number of blind juveniles has been on the decline. The decline during the last two decades amounts to about 60 per cent due to the more effective treatment of syphilis (through the more rapid plasma test and prophylactic eyedrops and penicillin), the conquering of retrolental fibroplasia, and the reduction of eye accidents that used to account for about 40 per cent of juvenile blindess. Retrolental fibroplasia, first identified by Theodore L. Terry, once caused almost 50 percent of blindness in children of preschool age. Since its cause was discovered in 1953, this source has been all but eliminated. The disease is a fibrous growth (thus, fibroplasia) behind the lens in the retina (hence, retrolental) and in the vitreous fluid in premature underweight infants caused by the use of an excessive concentration of oxygen in the incubators.

According to estimates, at least 7,500,000 school children in the United States are in need of eye care, mostly because of errors of refraction and other causes that can be remedied. These children create no particular educational problems if the defects have been corrected. But two groups do create very definite educational problems, the partially sighted and the educationally blind. The partially sighted group, in contrast with the educationally blind, includes a number of defects that cannot be corrected beyond a very limited amount, such as: static low vision between 20/70 and 20/200 in the better eye after correction, progressive myopia, and more than 6 diopters of myopia in children under ten years of age, serious corneal opacities, cataracts, and nystagmus (involuntary movements of the eyeball). The incidence of the partially sighted among school children is given as 1 in 500, or over 60,000 throughout the country.

Educational adjustments. The preservation of vision is so important from the standpoint of educational, social, psychological, and vocational adjustments that the eyes should be routinely examined before school entrance and periodically thereafter for the discovery not only of errors of refraction and muscular defects but also of disorders developing from injuries or infections. The practice of proper eye hygiene, eye protection, and adequate illumination will conserve the vision of many thousands of children every year. The dread tracoma can now be successfully treated by sulfa drugs, and the terrors of glaucoma (the gradual accumulation of fluid within the eyeball, producing retinal deterioration) can now be reduced in many cases by early drug treatment or by surgery.

The partially sighted, as defined, may be assigned to sight-saving classes conducted in well-illuminated rooms (50 foot-candles in all parts) free from outside or inside glare, equipped with nonglare movable furniture, gray-green chalkboards, and special didactic materials, such as books printed in large, clear 18- to 24-point type, and cream-colored paper, and heavily-leaded pencils. The pupils prepare their lessons in these classes and recite with pupils with normal vision. Assignments should be made to these classes only after competent ophthalmological examinations. Here again, the tendency is developing of allowing these children to remain in the regular classrooms and supplying them with the necessary visual aids, preferably with some assistance from "resource" teachers. This movement is due to the better illumination now found in most classrooms, to the fact that vision does not deteriorate from the strain of use to the extent once believed, and to the desire not to set the children apart from the normally seeing group.

Blind children, as defined above, should be taught the reading and writing of Braille on the Braille slate or typewriter, in Braille classes in public schools or in residential institutions. The Braille alphabet consists of combinations of six raised points made by a stylus, or typewriter, arranged in letter and number patterns in cells that can be read by the finger tips. Although sixty-four combinations are possible, contractions are used to reduce the bulkiness of the copy. The invention of Braille, by Louis Braille in 1825, which has made the literature of the world available to the blind, represents the greatest single contribution to the education of the blind. Braille material can now be rapidly reproduced on a newly devised multicopy machine. Braille should be supplemented by "talking books" (long-playing phonograph records or electric tapes), now often rendered with special sound effects and dramatizations, and by dictaphones. Many times as much material can be covered in talkies as in Braille transcripts. The educational program should include, according to individual needs, perceptual and motor training, walking with the aid of specially constructed white canes, literary instruction, music, speaking, the correction of speech difficulties (often due to the inability to imitate visual cues), industrial and fine arts, and in later years vocational preparation including training for professional services.

When the Braille class is in school, the pupils should be afforded frequent contact with the seeing pupils in the regular classroom. In fact, the trend is toward placing the blind in the regular rooms and providing them with needed specialized instruction by a "resource" teacher on a part-time basis in a "resource" room. The tendency is also growing of transferring pupils from the residential schools, after they have acquired the fundamental learning techniques, to the public schools and provide them with readers; and also of admitting the young blind in the regular kindergartens—all for the purpose of affording contact with the seeing world. Important aspects of the program are psychological adjustment of the child to the blindness and the sighted world, the prevention of "blindisms" (automatic self-stimulation patterns of movements, such as swaying or rolling), and the prevention of emotional and personality maladjustments engendered by timidities, worries, brooding, frustrations, feelings of inferiority, and self-reproach. Psychotherapy is indicated for some parents who may have become maladapted or despondent because of agonizing experiences.

Blindness as a handicap makes itself felt most severely in perceptual patterns and in travel. It is very difficult to explain a mountain or an ocean to a blind person. To be understood, these must be seen at first hand or in pictures. Color is likewise unknown to the blind. A very real problem in the instruction of blind persons is the need to provide for learning perceptual closure, that is, helping them to fit specific details into a meaningful whole. In most classes for the blind, three-dimensional models are used with profit, but generally the perceptions are still limited and often faulty.

The problem of travel or spatial orientation is most crucial. Indeed, given normal or superior intelligence, a blind person is limited in vocational pursuits only to the degree that he masters spatial orientation and independent travel. He must be able to keep his sense of direction all the time or quickly reorient himself if he becomes lost. In the past, seeing-eye dogs were a popular prop for this task. But a dog has limitations. He must be fed, bathed, exercised, walked, and loved. A dog becomes old at twelve or thirteen years. The death of a favorite dog many produce a serious emotional trauma in his master. In addition, a dog does little thinking; he obeys commands. If the blind master becomes confused or panicky, so will his commands and so too his dog. Walking canes are becoming more and more accepted as more satisfactory guides than the dogs. However, the task of teaching a blind person to be independent in his ability to move about remains a knotty one. It can be learned only through painful experience. If a blind person runs into a tree or barks his shin on a low fence or navigates a hazardous street-crossing, he learns important lessons, but a sympathetic observer must suffer the anxiety of the doomed and stand helplessly by throughout the performance. Often parents do their blind children great disservice because they cannot bear to see the hurt that is a necessary concomitant of the learning. This has been a telling argument in favor of residential and state-supported schools for the blind. There the lessons of learning to travel are no less painful, but the parents are spared no little anxiety, and the tasks are systematically and carefully graded in difficulty.

The orthopedically handicapped

Very many different muscle and bone disabilities in childhood create difficult adjustment problems for the schools. Only five major groups will be considered here: cerebral palsy, brain injury, poliomyelitis, muscular dystrophy, and multiple sclerosis.

Great popular interest has been aroused in these groups because of their high incidence, the obviousnes of the crippling effects, and the vigorous nation-wide financial drives in their behalf.

Cerebral palsy. This is a very complicated neuromuscular disorder caused by structural defects (lesions) in various parts of the brain, especially in the motor areas. About 90 per cent of the cases are congenital, caused by prenatal abnormalities, such as oxygen deprivation, precipitate delivery, mechanical injuries, the Rh factor, hemorrhages, and the like. The disorder is characterized by varying degrees of paralysis in one or more limbs and sometimes of the facial and other muscle systems. Types of muscle disorders found include spasticity, rigidity, athetosis (recurrent involuntary movements), ataxia, and tremors. The associated complications include mental retardation of various degrees (from 25 to 50 per cent of those affected), speech defects (over 50 per cent), visual defects (about 50 per cent), hearing impairment (about 25 per cent), and seizures (about 33 per cent).

The cerebral palsy category is one of the largest of the muscle disability groups. The United Cerebral Palsy Association in 1955 estimated the total number of persons with cerebral palsy in the United States at about 550,000. Two of the most thorough surveys gave the following results: the Schenectady County Survey in New York State in 1948, 152 per 100,000 for all ages; the state-wide investigation in Connecticut in 1950, from 155.4 to 182.8 for all ages under twenty-one years of age. It was acknowledged that not all cases had been located. European estimates run as follows: in England, 105 per 100,000; in Denmark, 208; and in Norway, 234. Including the undiscovered cases, the estimate for the United States has been placed as high as 591 per 100,000 of the general population, possibly an exaggeration.

Educational adjustments. Many schools and classes have been established in all parts of the country specifically for children with cerebral palsy. Many administrators assign them to the all-inclusive orthopedic classes, where they now usually constitute the major group. The school program should be highly individualized to meet the needs of each child. It should include appropriate, varied physiotherapeutic treatment as a basic requirement (muscle training to strengthen weak muscles, improve coordination, overcome contractures, develop new patterns of movement; massage; thermotherapy; adjustment of splints and braces; rest, nutritional improvement, and so forth); speech development adjusted to the conditions found; occupational training; instruction in the regular program of studies adjusted to individual needs; and psychological treatment designed to prevent or overcome hampering personality anomalies and emotional disturbances. Surgical treatment and bracing, in which there have been distinct advances, are needed in many cases. There is also need of drugs to increase the tone of flaccid muscles and relax stiff or hypertonic muscles. If the classes are located in or near an ordinary school, the pupils should be afforded the advantages of social and educational contact with the normal children. In fact, when nothing more can be done for these children along orthopedic or physiotherapeutic lines, they might be transferred to the regular grades, or special classes for the mentally handicapped in the case of mental retardates.

Children with cerebral palsy constitute a singuarly difficult group for which to provide educational services. No consistent characteristics can be identified that describe all the youngsters.[16] The variation in severity of involvement is so great that generalization as to needs does not apply. The first task is a medical one. However, correcting speech disabilities even in these cases is not purely medical. The next task is psychological, allowing the child to develop a self-image that is realistic yet optimistic. Specific prescriptions do not apply to all. Yet the greatest single contributing factor is the attitude of the teacher and parents toward the child with his handicap. A matter-of-fact understanding of the limitation and a method of procedure that insures intelligent handling with no special favors seem best. This attitude is contagious. Since an important goal is to let the child learn to be as independent as possible, it becomes vital to his success that the teacher does not do things for the youngster that he can do for himself—albeit after strain and struggle. This helps to build the attitude of self-worth necessary to the avoiding of serious social as well as physical crippling. All else follows. With the attitude of personal adequacy the child can accomplish anything he wishes within the limits of his physical handicap. Without it, the child becomes a wasted life.

Brain injury. To contrast those with cerebral palsy and those with brain damage as though they were radically different and to list them in separate categories is somewhat paradoxical, for all of those with cerebral palsy have brain injuries. Nevertheless, the practice obtains of applying the designation "brain-injured" to a group of deviates who manifest little or no motor deficiencies, but rather perceptual, conceptual, learning, personality, and/or behavioral disorders, sometimes in a very annoying degree. These children are often characterized by high distractibility or undue fixation of attention on irrelevant stimuli. They tend to apprehend discrete impressions rather than wholes. The perceptual confusions often involve number relations, letters, words, and figure and ground. Many tend to be flighty, restless, uninhibited, emotionally unstable, and lacking in persistence, although some are subject to perseveration. Different parts of the cortex, subcortex, and brain stem seem to be affected in many of these cases.

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[16] O. P. Kolstoe, "Cerebral Palsy," in *World Book Encyclopedia* (Chicago: Field Enterprise Educational Corporation, 1958), vol. 3, pp. 1314–1314a.

Strauss and Lehtinen[17] described the psychological characteristics of these children and developed educational programs that have been successful. Unfortunately the label "brain injury" has tended to cloud the educational picture. Many teachers have used techniques appropriate for children with perceptual disorders of this kind simply because a neurologist or psychologist has indicated the presence of brain damage. This is certainly not appropriate educational procedure. If a child demonstrates the learning disorders described by Strauss and Lehtinen, then their educational techniques are excellent, regardless of whether brain damage has been established or not. Conversely, a finding of brain damage does not automatically indicate that these techniques will be of any real help. Educational techniques that fit the learning characteristics of the child should be selected. Their uses should not be based on a label of "brain injury" or lack of it.

Poliomyelitis. This nervous malady is the product of the invasion of the central nervous system by one of three ultramicroscopic organisms, known as the Leon, Brunhild, and Lansing viruses. The virus attacks adults as well as children, but the incidence is the greatest for children from five to nine years of age. Most persons are immune to these viruses, possibly because their blood contains sufficient polio-fighting antibodies to prevent the virus from reaching the nerve cells, although many persons doubtless suffer mild attacks not recognized as polio. Moreover, most persons recover from the attacks without any injury.

The last few years have marked a revolution in the prevention of the crippling effects of this virulent disease through the use of gamma globulin and the Salk vaccine. These favorable results justify the prediction that paralytic polio will be virtually eradicated as soon as the full program of vaccination has been carried out, except for isolated cases that escaped treatment or did not respond to treatment.

The aftermath from the past and the sporadic cases from the present will pose definite problems for the schools during the next decade or two. At present there are about 300,000 paralytic polio cases in the country, of whom about 60 per cent are under twenty-one years of age. The large majority of the paralytics can do the language arts work of the regular grades owing to the fact that their intelligence has not been impaired by the disease, although some school-age children may need restorative coaching if they were not supplied with home, hospital, or two-way instruction during enforced hospitalization.

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[17] A. A. Strauss and L. E. Lehtinen, *Psychopathology and Education of the Brain Injured Child* (New York: Grune & Stratton, Inc., 1949), vol. I, "Fundamentals and Treatment."

A comprehensive program of rehabilitation during the different stages of the affliction would include medical, surgical, and prosthetic measures, speech therapy, and the preparation of the child to adjust to his eventual occupational and social problems of living. The psychological treatment is directed toward the development of morale and realistic attitudes toward irremovable disabilities; preventing or overcoming the effects of disturbed body images, feelings of anxiety, incompetence, guilt feelings, discouragement, overprotection, self-pity, frustration caused by social discriminations and insults; and the development of acceptable, understanding, cooperative attitudes on the part of the child's peers, parents, and the citizenry. The goal of the schools' educational program in this as in other areas is successful, satisfied, self-sufficient living with one's remnants of limitations after rehabilitation.

Muscular dystrophy. Great popular interest in this painless but fatal malady has recently been aroused by the vigorous financial drives for research funds waged by the Muscular Dystrophy Association of America, which was established in 1950. The drives had brought almost $13,000,000 by early 1957 for the support of almost 100 research projects and aid to families in need. According to the Association, there are 200,000 victims of this disease in the country, of whom 50 per cent are children between the ages of three and thirteen. The malady has been invariably fatal, not from the disease itself but from growing weakness that increases susceptibility to infections. Those afflicted before the age of five usually die within five years, whereas most of those affected during adolescence and early adulthood may succumb at about thirty years of age.

Although the cause, prevention, and cure of the disease are unknown, it is primarily a disease of the striated (voluntary) muscles, not of the nerves, which involves a disturbance of metabolism of creatine and possibly other elements and a shortage in vitamin E. Four forms have been identified, but only the childhood form will be considered here. Known as pseudohypertrophic dystrophy and confined very largely to boys, it usually develops insidiously between ages two and seven. The child begins to waddle, stumble, and fall. He finds it increasingly difficult to walk about and to get up from the floor, because of growing atrophy of the muscle fibers and ensuing weakness. The atrophied parts first enlarge, through the accumulation of fat, especially in the calves of the legs and the forearms and shoulders. Eventually the fat disappears, hence, pseudohypertrophy. The child becomes increasingly emaciated and helpless through growing paralysis, without remissions, of all the limbs and often the chest muscles, so that he may have to use an iron lung, portable respirator, or rocking bed. Many must eventually spend their time in bed, in an armchair, or wheel chair. The growing muscle deterioration is often accompanied by mental deterioration.

Multiple sclerosis. Multiple sclerosis is a progressive disease like muscular dystrophy and, therefore, often confused with it. However, the development of hard nodules, called plaques, in the nerves, generally in the spinal cord, which destroy the myelin or protective sheath, establishes it as an attacker of the nerves, not the muscles. It is primarily a disease that attacks people between twenty and forty years of age. Although the symptoms are highly variable in kind, severity, and duration, characteristically the victims complain of a tingling or gnawing kind of pain in their extremities, of a dimness of vision as though a curtain were being drawn in front of one or both eyes, and of a heaviness and uselessness or paralysis of limbs. There is typically found an absence of upper abdominal reflex with a retention of the lower abdominal reflex. In most cases the course of the disease is recurrently acute and remissive, with each remission showing progressively more damage, so that, although the symptoms come and go, after each attack the patient is somewhat more involved than he was before the acute stage. This coming and going may persist for a few months or for twenty years or more, but there is no known cure.

No specific cause has been demonstrated either. Speculation has included the possibility of a poisoning agent, of a micro-organism, or a filterable virus, of a chemical abnormality of the blood, such as excess protein or potassium lack, but none of these possibilities has been proved. This makes treatment tenuous. Many things have been tried with some success, such as fever treatment, protein shock, quinine, high fat diet, and potassium and histamine injections, but since the treatment is specific to the symptoms rather than being based on a known cause, they have not effected a cure for the condition. At the present time multiple sclerosis rarely is fatal. Most sufferers succumb to intercurrent infections that occur as a result of the weakening caused by the disease. Were this not the case, however, death would be the ultimate result of multiple sclerosis.

Many of these unfortunate victims of either muscular dystrophy or multiple sclerosis get into the regular grades or special classes before the deterioration has gone too far, but it is not clear just what the schools can accomplish except to apply palliatives—exercise, massage, physiotherapy, rest—possibly relaxant drugs and the like have their place as supportive treatment.

Children with epileptic seizures

Epilepsy is one of the major nervous maladies, with the estimates running from 500,000 to 1,500,000 children and adults throughout the country. It is characterized by various kinds of involuntary, uncontrollable attacks, such as: grand mal, which consists of a sudden loss of consciousness and violent jerkings of the limbs and other muscles; petit mal, characterized by transient impairment of consciousness with or without slight twitchings of different muscles; focal, such as head turning, or finger, arm, or leg movements without loss of consciousness; Jacksonian attacks, which are also localized, but spread from hand or foot upward without loss of consciousness unless they become generalized; psychomotor attacks (formerly called epileptic or psychic equivalents), characterized by automatic activities in the twilight of consciousness with subsequent amnesias of the happenings; and serial epilepsy (status epilepticus), which consists of rapidly recurrent seizures without recovery of consciousness during the series.

Many of the attacks are caused by lesions in different parts of the brain (referred to as symptomatic epilepsy). Most are of obscure origin and are designated essential, idiopathic, or cryptogenic epilepsy.

Great advances have been made in the field of epileptology during the last third of a century. Among these are: (1) electromagnetic recording of the brain waves in greatly magnified form, by the electroencephalograph, which shows that epilepsy is a form of dysrhythmia (abnormal electric brain waves), which is far more prevalent among the relatives of the epileptics than in the general population, suggesting a genetic predisposition; (2) the photographing of areas of destruction or cavities in the brain by means of a special X-ray apparatus (pneumoencephalograph); (3) the revolution of the medical treatment by improved surgery and especially by synthetic anticonvulsant drugs, which effectively control convulsions in about 75 per cent of the cases about 75 per cent of the time. Tranquilizers are of temporary value in the control of emotional and behavioral disorders.

With these advances has come a noticeable improvement of the attitudes of the public, professionals, and employers toward the epileptic, although much remains to be done to remove the discrimination and intolerance that still exist. Epileptics whose seizures are controlled should now be admitted to regular schools if they possess normal intelligence. A small number need the services of the special class for the mentally retarded. Another segment of very limited potentials or with severe, uncontrollable seizures or who lack proper home care or support should be given the advantages of colony or institutional life.

There are hundreds of jobs of different kinds that can be successfully discharged under proper safeguards by epileptics who remain at large, varying from repetitive factory jobs to clerical and professional services.

One of the major jobs of the educator and social worker is to assist in developing an attitude of acceptance of the epileptic in the schools, social institutions, and occupational establishments through a correct understanding of the condition. Epilepsy is a disorder like any other disease, and not a mysterious affliction caused by evil spirits. It can be treated scientifically like any other disease. In fact, it is more responsive to treatment than many other ills, such as encephalitis or muscular dystrophy. That epileptics tend to develop emotional disorders and personality disturbances is recognized, but they do so largely because of the slights and insults they have suffered at the hands of their fellow men. They have been shunned, isolated, ostracized, hidden away, excluded from school, rejected by playmates and even by their parents, who have felt ashamed of them. They have often been denied employment solely because they were epileptics. The reclamation of the epileptic will not be completed until they have been fully accepted by society as human beings subject to a nervous disorder for which they are not responsible, instead of being regarded as extra-human creatures. Epilepsy may be an enigma and a great misfortune, but it is not a stigma.

Miscellaneous groups of physically handicapped children

Health restoration programs, in nutrition or health classes or in the regular grades, should be afforded certain seriously malnourished, pretuberculous, tuberculous, cardiopathic, cancerous, and rheumatoid children, and convalescents who may be recovering from pneumonia, influenza, streptococcal infection, rheumatic fever, and chorea. The program would include improved nutrition, rest, adjusted exercise, recreation, and the development of proper health habits, carried out under a system of periodic check-ups. The teacher's function is to refer suspected cases to the health department and to follow the suggestions offered. Because of space limitations, further comments will necessarily be restricted to children with damaged hearts.

Heart and circulatory disorders—of which there are more than twenty—constitute the major source of mortality among people of all ages in this country, about 800,000 deaths annually. Of the estimated 10,000,000 heart cases, about 500,000 are children, approximately two-thirds of whom are rheumatic fever cases. Rheumatic fever is usually caused or preceded by a streptococcal infection that causes a "strep" throat, tonsillitis, scarlet fever, and/or middle-ear disease. The greatest disabler of childhood, it often attacks children between the ages of five and ten, with possibilities of later recurrences. It often attacks the joints, the muscles, and the valves and linings of the heart, causing scarring of the valves and heart enlargement, a condition known as rheumatic heart disease.

The great progress achieved in the field of cardiology during the past decade or two justifies the belief that heart maladies will be greatly reduced in the near future. The progress has been along the following lines:

1. The surgical repair of congenital or acquired heart defects, including the correction of scarred or roughened surfaces of the valves, opening fused valves (stenosis), artery grafting, cutting and tying arteries, connecting the pulmonary artery and the aorta (the "blue baby" correction), the closing of cavities or tears, and removing constrictions and obstructions (as in high blood pressure and coronary artery disease). Such delicate operations have been made possible by

the use of heart-lung machines to bypass the heart action, and "cardiac pacemakers."

2. The prevention of rheumatic fever or the lessening of its effects through early diagnosis and treatment with sulfonamides, penicillin, ACTH, cortisone, salicylic drugs like aspirin, and other drugs; and the prevention of bacterial infection of the heart lining, (endocarditis). The progress achieved in this area is monumental.

3. The use of new drugs to lower the blood pressure (for example the recent antihypertensive chlorothiazide).

The teacher should strive to keep abreast of the dramatic developments in the field of heart science, so that he will be able to refer suspected cases to the health department more promptly and efficiently and be able to adjust his program to the needs of different kinds of heart disabilities in accordance with the medical recommendations. A competent representative of the health department should keep teachers current on developments through "refresher" talks. Such information may also be obtained at no cost from the American Heart Association.

The acute stage of reheumatic infection calls for bed rest and antibiotics. If the convalescent stage is prolonged, home or hospital instruction and recreation should be provided to keep the child happily occupied and up to grade in his school work. On return to school, some will require rest periods, the continuance of prophylactic treatment, and restriction of exercise. Most will profit from a moderate amount of exercise. Some will merely have to avoid strenuous physical activities in athletics or work pursuits. With modern treatment few will require lifelong restriction of physical activities. The treatment should in all cases be guided by medical prescriptions.

Many children who have been treated for heart damage can now participate in the full round of activities of the physically normal child, and should be encouraged to do so in order to develop sound attitudes toward the disability and prevent the development of emotional and personality disturbances. The school's program should include not only the adjustment of the pupil's activities at the time, but also the planning of his after-school occupational career through vocational preparation. A recent innovation that shows promise is the "work classification units" of which over forty are now in operation throughout the country for assessing the cardiac's physical, emotional, intellectual, and social needs in job placement.

Summary

Perhaps one out of every seven children of school age needs some special educational services beyond what is available in a usual classroom in order to make the most of their potentials. Only 20 per cent of those needing this help are receiving it at the present time. The mentally retarded, deaf, hard-of-hearing, blind, partially sighted, speech handicapped, and orthopedically involved children each have unique educational probems that require specific techniques, materials, and procedures that are not interchangeable from group to group. Each should be taught by highly skilled people trained to understand the problems inherent in the disability.

Common to all handicapped children is their need for the development of a realistic understanding of their strengths and limitations and the development of a wholesome personal self-concept. The psychological effect of each kind of handicap on the personality of each child is a most telling argument for the establishment of special services for these children.

QUESTIONS AND EXERCISES

for discussion and study

1 Why do estimates of the number of children who need special educational services vary so much?

2 Do these estimates apply with any degree of certainty in other countries?

3 What relationships does clinical psychology have to special education?

4 Is special education an extension of the psychology of individual differences?

5 How can a distinction be made between the mentally retarded and the mentally ill?

6 Under what circumstances should a mentally retarded child be institutionalized?

7 Do the services available from a diagnostic clinic outweigh its limitations?

8 Why is it so difficult for deaf children to learn to read material above the fifth-grade level of difficulty?

9 Why do deaf children have such a difficult time learning to use a hearing aid?

10 In the past, schools for the blind trained their students for careers in music. Why has this been de-emphasized?

11 In which vocational level are blind adults most at a disadvantage, unskilled or professional?

12 Many of the attempts to cure stuttering have resulted in some improvement. Why? Some cases may be made worse by certain techniques. Why?

13 What kinds of sounds are the most difficult for deaf children to learn to speak?

14 Why is skill as a speech correctionist insufficient to assure success as a teacher of deaf children?

15 What special provisions need to be considered first for children with more than one handicap?

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III

GROWTH AND DEVELOPMENT DURING CHILDHOOD AND ADOLESCENCE

CHAPTER 7

General nature of development

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"AT EACH MOMENT OF LIFE, any person is in process of changing into something a little different from what he now is. The whole pattern is changing, and it is important to keep in mind at one time both the fact of pattern and the fact of change. What the pattern at any stage will be depends upon the previous pattern and upon the influences being brought to bear upon the individual from his present surroundings. But it depends also on his own *response*, both to what has gone on before and to the influences that are acting upon him now. A person to some extent shapes the pattern of his life by the choices and decisions he makes at successive stages. Once a choice has been made and its effects built into the developing structure, it can never be eradicated. Development is a one-way street."[1]

Perhaps no better theme than this quotation could be found for a discussion of human development. First of all, it suggests that education should be broadly rather than narrowly conceived. Education may be thought of, from one point of view, as the process of attaining basic skills such as those involved in reading, writing, speaking, and computation. It may be thought of as acquiring knowledge of geography, history, science, and other subjects. It may be conceived more generally as "learning to think."

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[1] L. E. Tyler, "Theoretical Principles Underlying the Counseling Process." *Journal of Counseling Psychology*, V, No. 1 (Spring, 1958), 6.

However, there is more to individual development than this. It is a many-sided process. Not only are intellectual aspects of a child's development important in education, but also the social and emotional phases of his changing personality. Thus, education may be thought of as attaining emotional stability. It may also be considered as the process of coming to terms with other people—learning to live in many kinds of groups and communities. It should also be conceived as the process by which the individual comes to terms with himself—becomes aware of his strengths and his limitations and arrives at a concept of himself.

All these aspects of development are interrelated and interdependent. It is fruitful in studying the individual and in portraying the process of development to describe the changes in terms of broad categories. But it is important to remember that to some degree this kind of description and interpretation is artificial. To understand the child, the adolescent, or the adult, it is necessary to see him as a person possessing a certain *pattern* of development and, at any moment, exhibiting uniqueness in relation to his fellows.

It is customary, too, in writing about human development, to discuss it in stages. But in dealing with a child at any one stage in his education, it is easy to overlook the *process* that underlies a change in his behavior, and thus to fail to realize that what he does at one time is the product of change over a long period. This principle pervades every phase of development.

Although the fact (but not always the nature) of physical growth is apparent, and the progressive ability of the child to master more difficult tasks is taken as evidence of some underlying developmental process, teachers do not so readily understand that acquisition of specific behavior patterns, such as knowledge of word meanings, is also a matter of development, of progression. Or, if they consider some process of growth necessary for the emergence of such functions as walking, they may fail to see the fact of development in such mental functions as concept formation.[2] Too often educational practice is based on the tacit assumption that desired behavior takes form full-blown, so to speak, or is quickly produced through the medium of some psychological maid-of-all-work like repetition.

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[2] See, for example, the following study of the development of the *breadth* and *depth* of concepts: D. H. Russell, *The Dimensions of Children's Meaning Vocabularies in Grades Four Through Twelve* (University of California Publications in Education, XI, No. 5 [Berkeley, 1954]), 315–414.

Learning—a developmental process. It is generally understood (although the implications for guiding learning are all too frequently disregarded) that the attainment of skill is a process of progressive adaptation from an initial stage where the movements are awkward and poorly coordinated to one characterized by economy of movement and smoothness of organization. It is not so generally recognized that other than sensorimotor types of learning also involve a developmental process. It has been shown, however, that children's number concepts and their ways of dealing with concrete numbers change from rather primitive to progressively more mature stages.[3] The development of a typical pupil's ability to apprehend a number picture such as : : : : takes several clearly defined steps. He is likely first to count the dots to determine the number. Somewhat later he may distinguish a group within the total, and count the remainder, as 4, 5, 6, 7, 8 (partial counting). The next step is that of recognizing successive groups, as 4 and 2 and 2 (grouping). Finally he may be able to apprehend it as two 4's (multiplication).

The same study also revealed that children's success in learning the simple addition combinations is "largely conditioned by the level of ability attained in dealing with concrete numbers, or, in other words, by the degree of completeness and fullness which characterizes their concepts of numbers."[4] The child may carry over to the solution of the combinations the more-or-less mature methods he used with number pictures, namely, counting, partial counting, grouping, and multiplication and conversion. Success in learning the additive combinations is clearly related to the development of meaning for numbers.

These data provide excellent illustrations of the fact that concepts take form through a process somewhat comparable to that involved in the development of skill. In spite of this fact, textbooks and teachers bombard the pupil with a vast array of abstract terms and expressions for which he has developed no meanings, or, at best, very inadequate ones. Teachers, forgetting that their own familiarity with meanings is the subtle product of extensive and progressively organized experience, apparently expect pupils to apprehend abstractions with one inclusive act. Children's meanings, on the contrary, develop with experience through a complex process of analysis and synthesis, of expansion and restriction. Throughout the elementary- and secondary-school periods, meanings change in breadth (they encompass many more details or particulars) and also in depth (they represent more profound relationships).[5]

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[3] W. A. Brownell, *Development of Children's Number Ideas in the Primary Grades* (Supplementary Educational Monographs, No. 35 [Chicago: University of Chicago Press, 1928]), p. 110.

[4] *Ibid.*, p. 288.

Personality traits and development. Failure of parents and teachers to recognize that a developmental process operates in the acquisition of important personality traits results frequently in persistence of childish levels of reaction. If they forget that "psychological weaning" takes a long time and should begin early though gently, parents and teachers may perpetuate the dependence of childhood and dispose youth to timidity in facing an adult world. A mother who coddles her child by ordering his life in comprehensive detail from babyhood through adolescence should not be surprised if he cannot meet the demands of adult life aggressively when he reaches chronological manhood. When the teacher takes the responsibility for the pupil's learning for twelve years, there is little reason to expect the student to assume it as a college freshman. Parents who dance attendance upon a child from babyhood to adolescence are likely to find that the twenty-year-old is as egocentric as he was at two. The achievement of self-dependence and the escape from excessive egocentricity are not the product of magic wand-waving, but of a long and continuous process of development.

Genetic study of behavior is necessary. The foregoing illustrations of developmental processes should indicate the futility of trying to understand the nature of development merely by making cross-section analyses of behavior of different groups of children at successive chronological periods. Increments of development may not reveal the process, which McGraw declares can be observed only by directing attention, in the case of certain motor skills, to "the movements which give rise to an organized behavior-pattern, as well as the chronological sequence in which behavior-patterns reach maturity." [6] Development does not ordinarily proceed by leaps from one stage to another, but by a process of continuous change, one phase merging into another by almost imperceptible degrees. The genetic approach to psychology will be most fruitful as research is devoted to the continuous study of the *same individuals* in the *process* of development. Development is an attribute of the dynamic, integrated experience of a living organism.

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[5] Russell, *op. cit.*

[6] M. B. McGraw, *Growth* (New York: Appleton-Century-Crofts, Inc., 1935), p. 4.

Questions of status are important in education, but questions of the rate, limit, and process of development are more important. To facilitate adequate educational adjustment, for instance, we need to know a pupil's mental age (status), but it is still more essential that we should predict as accurately as possible the *rate* of future mental development. For this reason, the intelligence quotient—the ratio of mental age to chronological age—is an invention of the first magnitude in educational psychology. It is important to remember, however, that prediction of mental development is imperfect at best, and that it is particularly so in the case of some individuals.[7]

Although it is difficult to predict all aspects of later development, education at best always has a future reference. Teachers should ask such questions as the following: What is the probable length and character of this child's schooling? How rapidly will he develop in various ways in relation to other children of the same age? What special aptitudes may he have? What vocational and avocational plans are consistent with his capacities? How can his educational experiences contribute most effectively to the all-round development of his personality?

The developmental process has been characterized recently as "the actualization of potentialities." This actualization requires choice and self-limitation, and a resolution of realities and possibilities. Thus, one writer has explained: "At a later stage, all sorts of possibilities for personality development are ruled out by the fact that the individual spends his earliest, most formative years in a certain kind of family, in a certain geographical location, belonging to a certain kind of subculture. At still later stages, each choice that the person himself makes actualizes some possibilities but rules out many others. Thus if he commits himself to an attempt to make a career in music, and really takes it seriously, he will probably never be an athlete, although his neuromuscular structures would originally have made either line of specialization possible." [8]

In a very real sense, then, life is determined in considerable part by what one is able to do and what one decides to do, at a series of choice-points. If a high-school student chooses to take shorthand and typewriting instead of mathematics, he will later find certain educational opportunities and the careers that depend on them closed to him. One of the purposes of counseling is to aid the student to anticipate the future consequences of the choices he must make at all stages of his educational experience.

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[7] See discussion in Chaps. 9, 23 and 25.

[8] Tyler, L. E., *op. cit.*

Education and development. Educational activities are valuable to the extent to which they stimulate and guide desirable forms of development, to the extent to which they help the individual to realize, as fully as realities permit, his potentialities. Education should be concerned with the development of individuals, all of whom are different, each of whom is unique, and each of whom has to some degree a peculiar course of growth. Mass methods of education and arbitrary standards of accomplishment easily obscure the extent of individual development, or mercifully disguise the lack of it. The success or failure of a school system cannot be estimated in comparisons of local averages with national norms on standardized school achievement tests. Educational results must be expressed in the extent to which individual children have developed in proportion to their potentialities, not in terms of "averages."

General characteristics of development

Insight into the nature of development is fundamental to an understanding of teaching and learning. Although it is difficult to compress the results of many studies of particular aspects of development, it is possible to describe the general character of the process. The remainder of this chapter will be devoted to a discussion of some of the characteristics that have the widest applicability to the management of educational affairs.

Development is the product of the interaction of the organism and its environment. *Traits are not exclusively hereditary or environmental.* Development has been defined as a "process resultant from a constant flux or interchange of energies within an organism and energies within its environment."[9] Intrinsic forces, inherent in the genetic constitution of the individual, make up his "heredity."[10] Extrinsic or environmental forces are those influences brought to bear upon a new organism from the moment it is created. Although these two sets of factors that condition growth may be theoretically distinguished, it is not possible to ascribe any trait exclusively to heredity or environment. Some characteristics presumably take form more as the result of inherent growth factors than of *special* conditions of environmental stimulation, but it is nevertheless necessary to remember that *no* growth is possible without some stimulation, no development conceivable without an environment. Jennings made this interdependence of hereditary and environmental influences clear when he wrote:

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[9] McGraw, *op. cit.*

[10] There is no space here for an outline of the main facts of genetics. The student who is unfamiliar with the basic data concerning the transmission of hereditary characteristics should consult recent texts in the field.

> That which is directly inherited, in the way that property is inherited, that which is passed bodily from parent to offspring—is the set of genes, with the accompanying cytoplasm:—certain substances in certain combinations, which, under certain conditions, give rise to the individual, having certain later characteristics. With the same set of genes, different environmental conditions may induce the production of diverse characteristics. . . . There is then no thorough-going distinction in kind between diversities producible by gene differences and those producible by environmental differences. Characteristics do not fall into two mutually exclusive classes, one hereditary, the other environmental.[11]

It is probable that the genetic constitution, the particular combination of genes in the chromosomes of the new organism, sets the limits and the general direction of development. But it is the interaction of these forces and those in the environment that produces development and that may profoundly influence many aspects of individual behavior.

Responsiveness to environment. Some aspects of development seem to be more the product of intrinsic than environmental factors. Anatomical growth, for example, is one, but even this phase of development is not entirely independent of extrinsic conditions, for extreme environmental factors may influence the growth of structure.

Other aspects of behavior are apparently conditioned in very considerable degree by the kind of environment in which the individual lives. For example, there are very few if any native interests. The intensity, the persistence, and the variety of interests are greatly influenced by such factors as: (1) the richness and variety of experience, in and out of school; (2) the stimulation of parents, teachers, and other persons who also engage in a variety of interesting and worth-while activities; (3) encouragement, positive directions, and successful performance.

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[11] H. S. Jennings, *Biological Basis of Human Nature* (New York: W. W. Norton & Company, Inc., 1930), p. 133.

The development of language also depends upon environmental stimulation. It has been discovered that children who come from homes of higher socio-economic status surpass those of inferior level in "length of sentences used, frequency of questions, proportion of remarks involving adapted information, and vocabulary." [12] Studies have also revealed that the language of only children develops more rapidly than that of children who have brothers and sisters, and that between the ages of two and five, "singletons" acquire language abilities more rapidly than twins. These facts have been interpreted in the following fashion:

> Apparently the only child imitates the speech of adults who are far along in the linguistic process; the single child imitates the speech of older brothers and sisters, who are a little farther along; twins or triplets imitate each other and develop poor linguistic form as well as poor articulation. In the light of these facts, one wonders whether the examples of language usage furnished by parents and associates in the home and play situation may not be of more importance as determiners of spoken language than is school instruction. . . .[13]

Social behavior is likewise responsive to the demands and sanctions of the social groups in which the individual participates. The growing child will develop competitive and cooperative behavior in the proportion and in the degree to which these patterns of action are the means of attaining his goals, and to the extent to which the social groups of which he is a member reward him for one or the other or both forms of response. It is increasingly apparent that competitive tendencies have no more foundation in original nature than cooperative ones; the acquisition of specific competitive and cooperative activities is the product of response to the social context. From a careful study of the development of sympathetic and social behavior in children, the following conclusions emerged:

> . . . we have no a priori basis for expecting sympathetic behavior to be more dependent upon learning than is angry behavior. At least, distress when others are distressed seems primitive, naïve, and reasonably universal, without inculcation by adults. In both anger and sympathy, techniques of response are learned from grown-ups and child associates; the situations to which one may respond with the techniques thus acquired

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[12] A. T. Jersild, *Child Psychology* (4th ed.; Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1954), p. 415.

[13] J. E. Anderson, "Child Development and the Growth Process," chap. 1 in *Child Development and the Curriculum*, Thirty-eighth Yearbook of the National Society for the Study of Education (Bloomington, Ill.: Public School Publishing Company, 1939), p. 33. Quoted by permission of the Society.

> are also learned, and in each case the culture determines the amount as well as the character of the responses. . . . We may indeed say in general that sympathetic behavior increases relatively in any individual or group, and insofar as the situation is conducive to it.[14]

The nature of group organization is reflected in the activities and attitudes of the individualized members. When a club of junior-high-school boys was organized on "autocratic" lines, with a dominating adult leader who made all decisions and gave authoritative directions, the members tended to work alone rather than together in small groups; they exhibited antagonistic attitudes toward one another, and though outwardly submissive, acquired strong resentment toward the person in control. The members of a democratically organized group, on the other hand, when encouraged to work out plans cooperatively with the adult leader, showed more spontaneous group activity, friendly and constructive relationships, and more wholehearted interest in the task.[15]

The effect of environmental factors upon intelligence. The development of intelligence seems to be very much less susceptible to control by environmental conditions than the development of interests, language abilities, and patterns of social behavior. The notion of the stability of rate of development of intelligence has long been embodied in the doctrine of the relative constancy of the intelligence quotient. Recent research, however, has indicated that there may be a considerable amount of fluctuation in an individual's intelligence quotient on retesting over a period of time. This problem and others relating to the effects of hereditary and environmental factors on individual differences in general and upon intelligence in particular will be discussed in Chaps. 23 and 25. It will suffice here to quote from Anderson who makes the following statement:

> Perhaps a conservative statement would be that, although intelligence is in large part determined by hereditary components, it is modified or changed in some degree by environmental factors. The environment determines in large part the extent, degree, and manner in which the innate potentialities of children are realized, and the manner in which hereditary

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[14] L. B. Murphy, *Social Behavior and Child Personality* (New York: Columbia University Press, 1937), pp. 296, 298. Reprinted by permission of Columbia University Press.

[15] R. Lippitt, "An Experimental Study of the Effect of Democratic and Authoritarian Atmospheres" (University of Iowa Studies in Child Welfare, Studies in Topological and Vector Psychology I. [Iowa City: University of Iowa Press, Feb., 1940]), pp. 45–195.

> capacities are put to work. In general, the more stimulating an environment is, short of extreme pressure, the better are potentialities realized.[16]

Admitting that the limit and direction of mental development are laid down in the constitution of the organism at the time of fertilization, it is important for educators to predict as early as possible (provided they revise their predictions repeatedly as new data are obtained) the general nature of these directions and limits; to be constantly on the alert for evidence of special aptitudes that may be nourished; and to ask themselves constantly what experiences will lead to the greatest realization of each child's potentialities.

Development is a continuous and gradual, rather than a saltatory, process. If one should observe a random sampling of eighth-grade boys and girls, he would be struck by what seem to be decided differences between adolescence and childhood. Most of the girls, and a somewhat smaller proportion of the boys (because, in general, girls develop earlier than boys) would show some of the superficial traits of early adolescence—the girls in the giggling, boy-conscious, show-off stage; the boys in the awkward, grinning, self-conscious period of growth. The remainder, usually smaller in stature and more childish in their reactions, would seem curiously out of place in this group. They have not yet crossed that indefinite area on one side of which lies childhood and, on the other, adolescence. The differences between individuals in two well-differentiated stages of development seem to be pronounced, so much so that it was once believed that development was characterized by rather sudden transformations. But when the construction of reliable physical and mental tests made possible the measurement of the same individuals at successive intervals, investigators were struck with the essential continuity and gradual nature of the developmental curves of both physical and mental functions. It must be admitted that continuity of the process is more impressive when individual growth curves are thrown together into a composite picture. Individual curves usually show considerably more fluctuation, and may now and then show a rather pronounced change.

The statement that development is continuous does not mean that it may not be more rapid at some periods than at others. Neither is it inconsistent with the fact that different traits develop at different rates and reach the limit of development at different times. The fact remains that, in spite of these fluctuations in development, manifestations of behavior are the product of extensive underlying preparation and maturing. If one compares the mature with the immature status, tremendous contrasts result. When the *process* is investigated and the *dynamics* of development are charted, the progressiveness of change is sharply delineated. Terms like "expansion" and "emergence" are more applicable to the actual developmental course than those suggesting sudden transformations. This means that the customary process of distinguishing developmental stages, and of dividing education into preschool, kindergarten, primary, intermediate, junior-high-school, and senior-high-school periods is one of convenience only—a convenience, however, that often results in obscuring the gradual movement of the child from one of these arbitrary levels to another, the emergence of new behavior from what has gone before, and the great variability among pupils in any one grade or level in mental age, reading ability, mathematical ability, social adjustment, and other characteristics.

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[16] Anderson, "Child Development and the Growth Process," *op. cit.*, p. 35. Quoted by permission of the Society.

Reference to Table 7-1 reveals at a glance the different rates at which certain traits develop. Although the child in question had a chronological age of 108 months, she had the mental development characteristic of a typical 134-month-old child and about the same level of reading ability.

Figure 7-1 shows the developmental pattern of a "socially competent, mentally retarded girl" whose mental and educational development lagged behind her physical growth and social development. (For meanings of abbreviations, see Table 7-1.)

Table 7-1

Cross-sectional data for girl, *G*1, at a chronological age of nine years[17]

Function measured	*Abbreviation*	*Age equivalent in months*
Height	H.A.	160
Reading	R.A.	130
Weight	W.A.	156
Strength of grip	G.A.	130
Ossification of hand and wrist	Ca.A.	135
Mental capacity	M.A.	134
Dental eruption	D.A.	119
Organismic age[18]	O.A.	138
Variability	A.D.	11.7
Chronological age	C.A.	108

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[17] W. C. Olson and B. O. Hughes, *Child Behavior and Development* (New York: McGraw-Hill Book Company, Inc., 1943), chap. 12, "Growth of the Child as a Whole."

[18] The concept of "organismic age" as used here is of doubtful meaning or value.

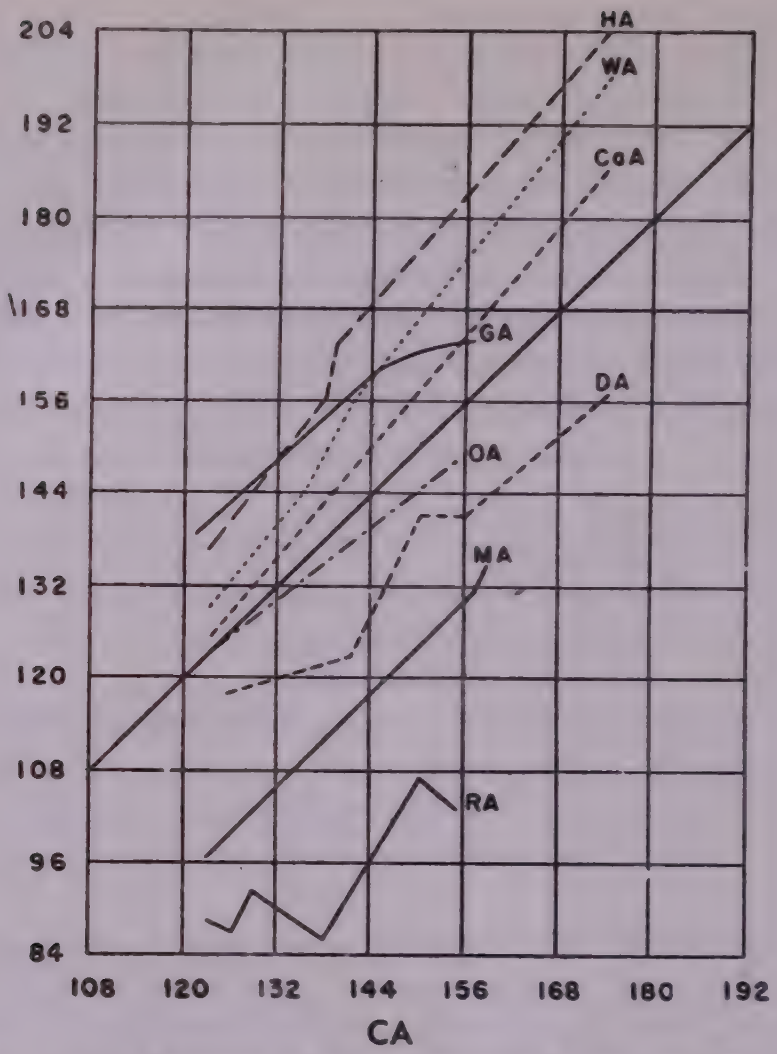

Fig. 7–1. Patterns of development for a socially competent, mentally retarded girl. For meanings of abbreviations see Table 7–1. (From Olson, W. C. and B. O. Hughes, "Concepts of Growth—Their Significance to Teachers," Childhood Education, 21 *(Oct., 1944), p. 56.)*

The child has many "ages." The principle that various aspects of the personality may grow at different rates—or that one may develop at the expense of the other—has made chronological age an unreliable basis of estimating maturity. It saves the school principal or superintendent much friction with certain families in the community if entrance

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It suggests more unity of development than the evidence justifies, and it arises out of an additive process that belies the term "organismic." See F. T. Tyler, "Stability of Intra-Individual Patterning of Measures of Adjustment During Adolescence," *Journal of Educational Psychology*, XLVIII (Apr., 1957), 217–226; and F. T. Tyler, "Concepts of Organismic Growth: A Critique," *Journal of Educational Psychology*, XLIV (Oct., 1953), 321–342.

to school is made dependent on reaching a minimum chronological age, but this method of admission creates severe problems of curriculum adjustment for the first-grade teacher. Data on mental age, "physical age," "social age," "emotional age," and so on, are imperative for the adequate adjustment of children to the school environment at every level of education. Constant acceleration of the mentally gifted child will soon place him in a foreign community as far as his physical and social development are concerned. The dull pupil who lags farther and farther behind others of his own age may be fairly well classified mentally, but ultimately becomes something like a giant among the Lilliputians. The dull, retarded child may exercise unfortunate leadership among younger children because of his greater social and emotional maturity. Or, the oversized boy may take out his resentment at his retardation by acting the bully and the brute. Perhaps even a more frequent result is elimination from school as a result of lack of interest, embarrassment at classification, and growing demand for participation in a grown-up world.

Inconsistencies in development are illustrated in persons who are fairly mature in many ways, but who still exhibit certain emotional reactions distinctly childish in level. Some college students, undeveloped in making choices and taking the consequences thereof without flinching, run for protection behind mother's skirts or dad's gruff voice when the first storm breaks. Many a grown woman manages her husband by recourse to a poorly disguised temper tantrum expressed in pouting, easy weeping, or constant nagging. The variations of the same childish means of getting one's desires satisfied are no less impressive in the behavior of the male. The fraternity reunion is probably one of the best places to observe fixated emotional adolescence in the middle-aged.

Development of ability in problem-solving. An extremely significant corollary of the principle of continuity in development may be stated as follows: *Although traits develop at different rates, and reach their maximum at different times, simultaneous rather than serial development of broad mental functions is the rule.* Educational practice, however, would seem frequently to be based on a decidedly contrary assumption. For instance, although the young child has been thought capable of sensorimotor and associative learning to the extent of acquiring specific skills and information, it has often been assumed that he is incapable of problem-solving behavior. There has been a pervasive belief, furthermore, that reasoning ability makes its appearance suddenly, and that it is primarily, if not entirely, the result of hereditary forces.

These doctrines have been in large part responsible for: (1) making the elementary school a drill school; (2) making a sharp distinction (in theory at least) in educational aims and methods of instruction between the grades and high school, and (3) neglecting systematic instruction in problem-solving.

Research, however, has shown that even the preschool child is capable of problem-solving behavior. One investigator[19] studied the problem-solving behavior of forty-four children, ranging from nineteen to forty-four months of age, in a series of situations somewhat comparable to those used by Köhler with his chimpanzees.[20] One series of situations called for placing a block, a chair, a block turned on its perpendicular side, or a block piled on top of a box in such a way as to secure a suspended toy. For the second series, the children were placed in a play pen with the toy outside. To get the object, the child was required to reach through the bars with a stick, to substitute a broom for the stick, to use a short stick to reach another longer one, which in turn could be used to procure the toy, and to place two parts of a fishing rod together for a tool. Seventy-two per cent of the total possible number of solutions actually occurred. The solutions showed evidence of ability to recognize the problem, and to perceive and employ means for reaching the goal. The author declared that no matter what type of response to the problem situation was made, the behavior culminated in a solution only when insight was attained.

Another study also showed that young children can discover and employ principles in the solution of problems.[21] The subjects were preschool and orphanage children ranging in age from three years, six months, to seven years, ten months. It was necessary to discover an associative principle and transfer it in solving new situations. One of the most interesting results was that no relation existed between the number of trials involved in solving the first problem situation and the number necessary to master the fourth and seventh, which were quite different from the first. Apparently the rapidity or slowness with which the principle was mastered in the beginning made no difference in its immediate transfer to new situations.

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[19] A. Alpert, "Solving of Problem-Situations by Preschool Children" (Contributions to Education, No. 323 [New York: Teachers College, Columbia University, 1928]).

[20] W. Köhler, *Mentality of Apes* (New York: Harcourt, Brace & Company, 1926).

[21] K. E. Roberts, "Learning in Preschool and Orphanage Children: An Experimental Study of Ability to Solve Different Situations According to the Same Plan" (University of Iowa Studies in Child Welfare, Vol. VII, No. 3 [Iowa City: University of Iowa Press, 1933]).

As the concepts of development should imply, competence in problem-solving increases with age. The young child is handicapped by meager experience, by inadequate language development, by inability to perceive subtle likenesses and differences, by lack of skill in overt behavior, and so on. *But on his level of development,* the child is capable of rational behavior. This fundamental truth should mean that at no stage should education be exclusively fact-getting or problem-solving. It means that insightful methods of learning should be employed to the maximum extent at all times, that learning at every level should be creative and purposeful, and that discovery and verification should be substituted wherever possible for passive acceptance and rote memorization. If the acquisition of problem-solving ability is, like other functions, the result of a developmental process, is there not reason to believe that competence in this field is definitely conditioned by the adequacy of stimulation and learning activity throughout the developmental period? The sort of training that should facilitate the development of problem-solving ability cannot be detailed here, but it is fairly certain that competence in reasoning, though heavily dependent, perhaps, on genetic inheritance, does not appear by magic, or achieve maturity overnight.

Development of many functions proceeds most rapidly in the early years of life. *The mental development curve.* Although research has shown that after birth different bodily tissues show very different growth courses (see Fig. 7-2), it is nevertheless generally agreed that in infancy the rate of general physical growth probably is more rapid than at any subsequent time.[22]

The curve of growth of the body as a whole shows rapid progress in the early years, followed by a period of lesser rate, until another acceleration occurs ordinarily between twelve and fourteen. The course of mental development is still somewhat obscure. It is clear that at three years, the sense organs have reached a very high degree of functioning. At birth, the nervous system has attained one-fourth and at

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[22] J. A. Harris, C. M. Jackson, D. G. Paterson, and R. E. Scammon, *The Measurement of Man* (Minneapolis: University of Minnesota Press, 1930).

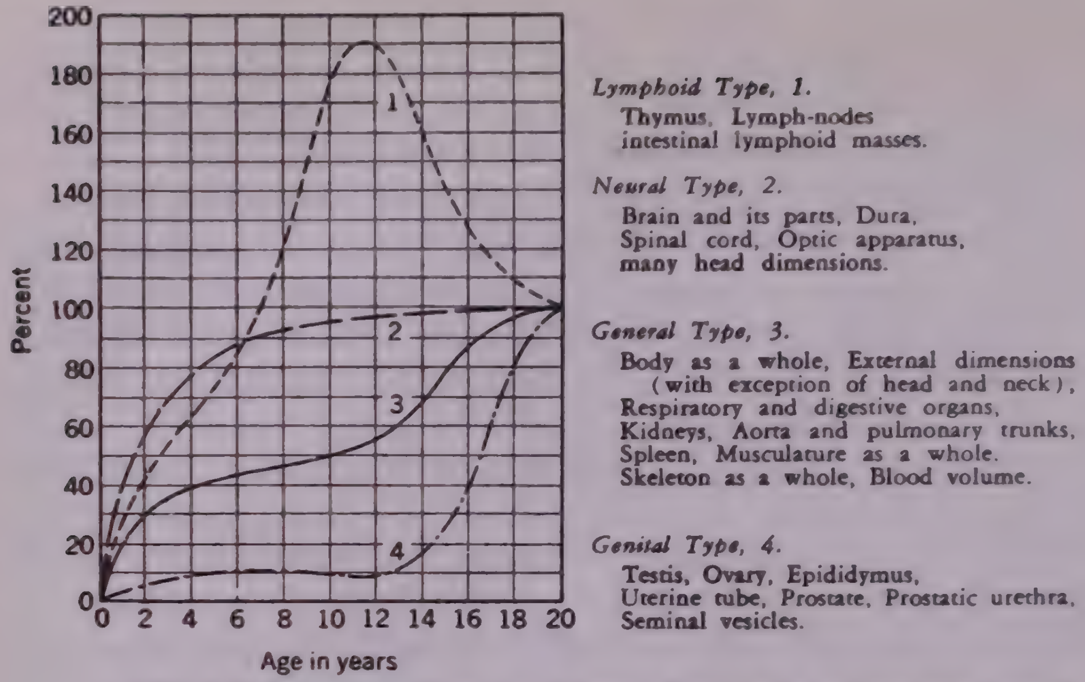

Fig. 7-2. Postnatal Growth. Curves drawn to a common scale by computing their values at successive ages in terms of their postnatal increments (to 20 years). (From Scammon, R. E., "The Measurement of the Body in Childhood," in **The Measurement of Man*, page 193. By permission of the University of Minnesota Press, publishers.)***

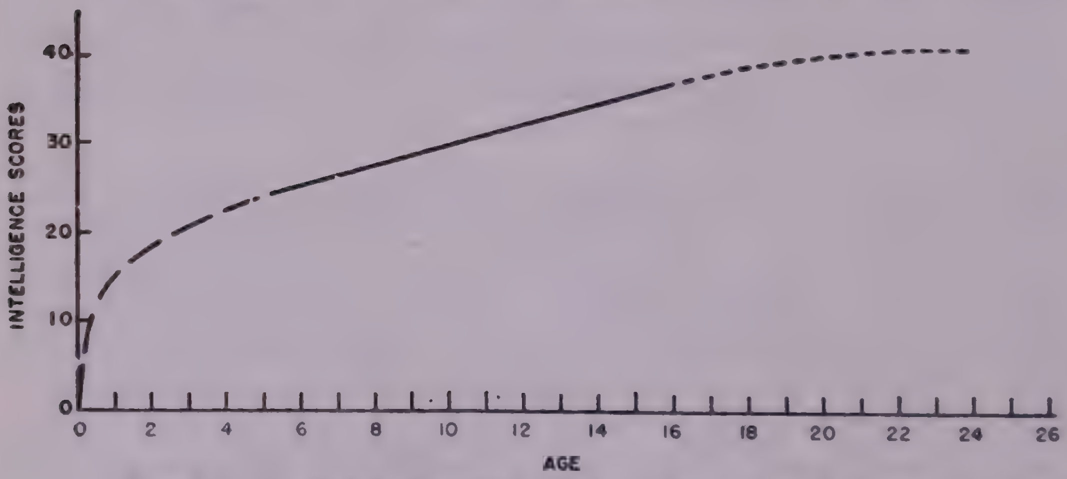

Fig. 7-3. Composite growth curve. The spaced part of the line is based on the work of Gesell; the solid part, upon numerous measures of growth as taken with group and individual intelligence tests; and the dotted part, upon the work of Thorndike. (From Jordan, A. M., **Educational Psychology*, page 341. By permission of Henry Holt and Company, publishers.)***

the age of six nine-tenths, of its adult weight. It is true that this rapid growth of the nervous system after birth does not necessarily mean that intelligence develops at a corresponding rate, but the results of mental

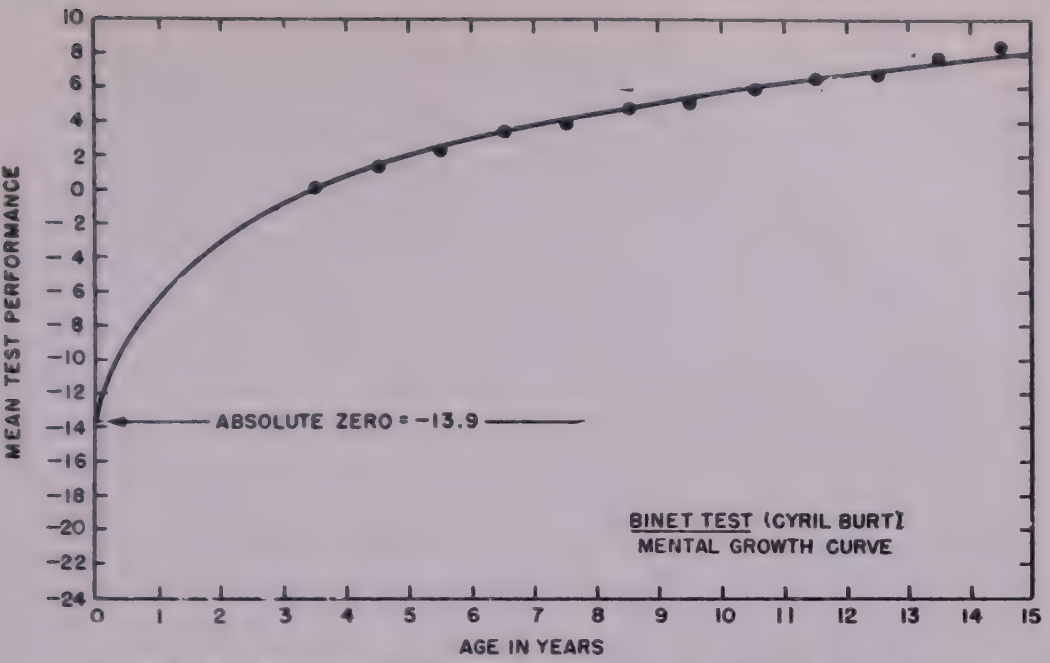

Fig. 7-4. Mental growth curve for the Binet Test. (From Thurstone, L. L., "The Absolute Zero in Intelligence Measurement,"* Psychological Review, 35: *page 196. Reprinted by permission.)

measurement and studies showing the rapid development of behavior in early years seemingly support the hypothesis of early acceleration of mental development. The problem of determining scientifically the shape of the mental development curve is complicated by the difficulty of locating a zero-point, and also by the difficulty of constructing measuring instruments that employ a constant unit of increment of mental ability. The use of different mental tests and different methods of scaling these tests have resulted in different developmental curves. It is possible, also, that measurement of different aspects of mental development will show unlike curves.[23] Many of the curves that have been plotted, however, have taken a negatively accelerated form, something like the hypothetical one in Fig. 7-3. Figures 7-4 and 7-5 show curves suggested by Thurstone and Thorndike, respectively, which tend to support the conclusion that mental development is most rapid in early years.

Educational significance of early rapid development. It is clear that many functions develop concurrently in the individual. As we have said above, the child does not mature in the ability to memorize

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[23] F. L. Goodenough, "The Measurement of Mental Growth in Childhood," in L. Carmichael (ed.), *Manual of Child Psychology* (New York: John Wiley & Sons, Inc., 1946).

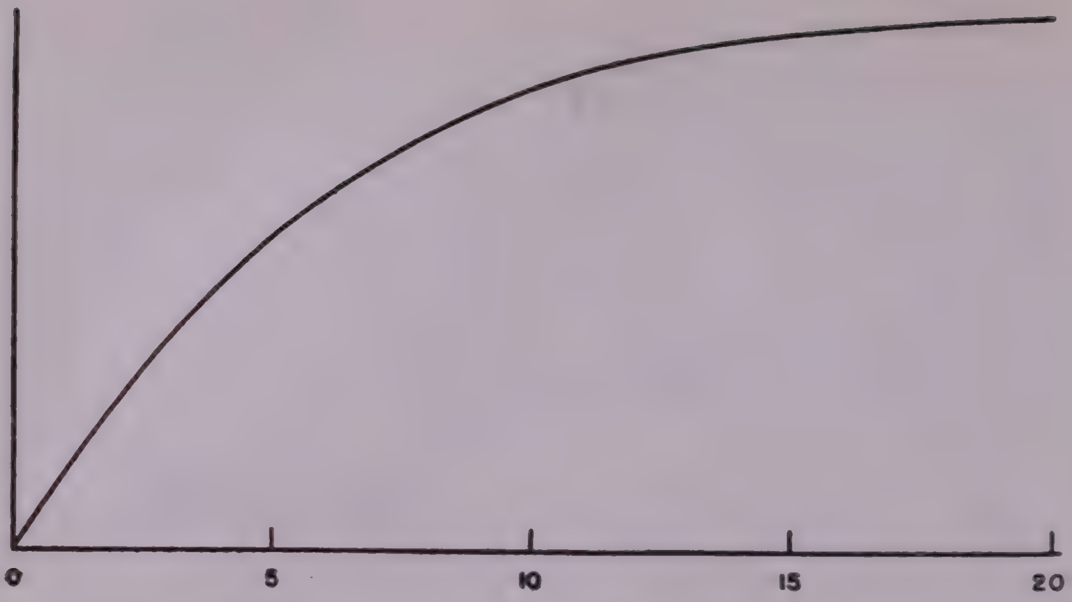

Fig. 7-5. The general nature of the relation of altitude of intelligence to age in years, 0 to 20. (From Thorndike, E. L., "The Measurement of Intelligence," page 466. By permission of the Bureau of Publications, Teachers College, Columbia University, publishers.)

before he develops any ability to solve problems. One sometimes hears it said that the purpose of the high school is to teach facts, whereas the purpose of the college is to teach how to think about facts. No such notion of serial development seems to be supported by the evidence. Therefore, the school should stimulate, or at least provide the opportunity or setting for simultaneous development of many functions. It should also capitalize on the rapidity of development in earlier years by providing a rich environment, and encouraging the fullest utilization of the child's capacities as the foundation for later accomplishment.

Basic trends in emotional and social adjustment may be established in the early, plastic years. However, the fixity of emotional conditioning before the age of five or six has probably been overemphasized, perhaps under the influence of Freudian theory. At any rate, recent studies of Vassar students have revealed that personality may change during college years. The senior investigator at Vassar has stated that, in comparison with freshmen, seniors exhibit the following qualities:

> Seniors have more cultivated tastes, broader interests, greater attachment to things of the mind. They are less authoritarian, less conventional and conforming, less fundamentalist in religious outlook; they

> show more awareness and appreciation of the diversity of viewpoints and standards adopted by others, and are more liberal in their views on interpersonal relationships.... They are well ahead of the freshmen in flexibility of thinking, capacity to suspend judgment, tolerance of ambiguity, skepticism, criticalness, realism."[24]

Nevertheless, the seniors seemed to be more uncertain, somewhat confused about their future role, more unstable in the sense that they had thrown off traditional values without having established new ones of their own. However, this uncertainty and confusion created heightened educability—an opportunity for further growth that perhaps should have arisen earlier in the students' careers.

Although it does appear that significant changes in personality may occur during college years, the possibilities of development at this time are by no means independent of the social and emotional characteristics the student has acquired earlier. It is conceivable that more appropriate preparation would enable the college student to take better advantage of the opportunities for fuller development that college should provide.

"Patterns of behavior in all species tend to follow an orderly genetic sequence in their emergence." This generalization is quoted from Gesell and means that the order in which various developmental traits appear varies but little from one organism to another of the same species.[25] Gesell believes that "this genetic sequence is itself an expression of elaborate pattern—a pattern whose basic outline is the product of evolution and is under the influence of maturational factors." In other words, he believes the developmental order to be due primarily to hereditary growth factors. This orderliness of growth in large part makes mental testing possible, since it greatly reduces the necessary extent of sampling. In other words, if a child cannot perform one task of a known developmental series, it is unlikely that he will be able to do one that regularly develops later. For instance, a child can copy a square (year 5 in the recent revision of the Stanford-Binet scale) before he can reproduce a diamond (year 7); and if he cannot do the former, it is rather certain that he cannot do the latter. The items that make up the Stanford-Binet scale represent a fairly orderly developmental sequence. Gesell has provided normative schedules of development in many aspects of infant behavior.[26] The following is a synopsis of reactions to a pellet placed before the infants.[27]

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[24] N. Sanford, unpublished paper. For a preliminary account of the Vassar studies edited by Dr. Sanford, see "Personality Development in the College Years," *The Journal of Social Issues*, XII, No. 4 (1956).

[25] A. Gesell, "Maturation and the Patterning of Behavior," in C. Murchison (ed.), *Handbook of Child Psychology* (rev. ed.; Worcester, Mass.: Clark University Press, 1933).

12 weeks	Transient regard for pellet (rarely).
16 weeks	More prolonged regard, usually delayed.
20 weeks	Immediate, definite regard, sometimes with increased hand-arm activity.
24 weeks	Approaches pellet with pronate hand; contacts pellet with little or no finger adjustment.
28 weeks	Approaches pellet with raking flexion of fingers, without thumb opposition; occasional delayed palmar prehension.
32 weeks	Approaches pellet with raking flexion but with increased thumb participation and digital prehension.
36 weeks	Approaches and contacts with simultaneous flexion of fingers; prehends with defined thumb and index opposition.
40 weeks	Approaches with all fingers extended; contacts with index finger and later prehends by drawing index finger against thumb.
44 weeks	Promptly prehends with index and thumb and with increased obliquity of hand attitude.
48 weeks	Approaches with index finger extended and lateral digits flexed; prehends with delimited plucking by index and thumb.
52 weeks	Approaches and plucks pincer-wise with increased deftness.

Relative developmental rates of individuals tend to remain constant from infancy to maturity. Individuals differ at birth, and the relative position of a given number of them not only tends to remain the same throughout the developmental period, but the absolute differences increase with age. The short of stature remain short, and the dull of intellect remain dull. Gifted children tend to maintain their superior status into maturity. Studies have shown that there is a positive relationship between level of intelligence in adulthood and in childhood.

The fact that the relative rates of development that may be determined for different individuals in infancy and early childhood tend to be maintained until maturity is of great importance in educational guidance. Since not only the individual's rate, but also the ultimate altitude, of his mental development may be estimated earlier, it is possible to estimate in advance approximately the amount and general type of education that will be best fitted to the individual. Here as elsewhere in interpreting human behavior, the teacher must remember that there may be individual exceptions to the general rule, and that it is undesirable to make prognoses from a single administration of a mental test, or, in the case of group examinations, from a single test, or from mental tests given at too early an age.

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[26] A. Gesell and H. Thompson, *Infant Behavior: Its Genesis and Growth* (New York: McGraw-Hill Book Company, Inc., 1934).

[27] *Ibid.*, p. 310; a fuller account of Gesell's point of view, with an exposition of several "principles" of development, may be found in "The Ontogenesis of Infant Behavior," in Carmichael (ed.), *op. cit.*, pp. 335–373.

Development is a process both of differentiation and of integration. *Differentiation in behavior.* Although they used different kinds of units, most of the older psychologies described the formation of complex behavior patterns as the synthesis, or integration, of smaller elements. The structuralist, for instance, considered the elements out of which complex mental processes were compounded to be sensations, images, and simple feelings. The behaviorist's units were simple reflexes. Recent experimentation in biology and psychology has shown, however, that the reflexes that the behaviorist compounded were often earlier derived from larger, less particularized, and less localized patterns of behavior. This process of emergence of localized behavior has become better known as the process of differentiation. Thus, Coghill has developed the thesis that "smaller or partial patterns arise by a process of individuation or analysis within a larger pattern, and that the primary pattern is a total reaction which normally expands from the first as an integrated process."[28]

Illustrations of differentiation. This process of individuation of localized reflexes from organismic patterns has been proceeding in the prenatal period, so that certain of these specific reactions are functional at birth. Nevertheless, Irwin has characterized the typical behavior of the newborn infant as "mass activity," in which the body as a whole seems to participate,[29] and has described the course of development as one from generalized to specific responses. This process can be observed in many aspects of behavior. The use of the fingers in grasping is a late stage of differentiation that extends from the shoulder and upper arm to the elbow, forearm, wrist, hand, and digits. Irwin believes that crying in newborn infants is a component of mass activity, and that the first differentiation is the hunger cry.[30] Language development shows the same phenomenon. The child may first used the word "daddy" in greeting many men; later application to one person only is the result of a differentiation process. Children's drawings show progressive development from gross outlines to recognition and use of more and more detail. Word recognition, at first the result of perception of general form or dominant striking detail, finally depends upon perception of minute details.

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[28] C. E. Coghill, "Individuation versus Integration in the Development of Behavior," *Journal of Genetic Psychology*, III (1930), 431–435.

[29] O. C. Irwin, "Amount and Nature of Activities of Newborn Infants Under Constant Stimulating Conditions During the First Ten Days of Life," *Genetic Psychology Monographs*, VIII, No. 1 (Worcester, Mass.: Clark University Press, 1930).

Development through integration. Carmichael, long a student of the earliest manifestations of behavior, has said that as a very broad generalization, "... an excellent case can be made out for the view that *individuation* is the pattern of all development, including all learning, but certainly in the experimental situation the concept of the *integration* or the combination of responses also provides, at times, a convenient working hypothesis."[31] Although specific responses may arise out of less differentiated behavior, they can be integrated to form new and more complex patterns.

McGraw, as the result of the careful observation of development of many types of behavior in very young children—swimming, ascending and descending inclines, roller skating, and so on—describes the process of integration as follows:

> ... development in behavior embraces both a process of narrowing down the activity to minimum essentials and a process of knitting together or integrating two or more aspects of a particular behavior pattern.... During the early stages of development the most obvious process appears to be from the general to the specific, but once an aspect of a pattern has attained a certain degree of determinateness, then the process of development becomes essentially one of integration.[32]

Many of our acts of skill involve the selection of already formed reactions and their reorganization, perhaps with other responses, into a new pattern. The development of concepts, or meanings, is a process of refinement that includes, on the one hand, a restriction of particulars to which the class name applies, and, on the other, an inclusion of more concrete items. Thus, development may appear at times to be primarily a process of emergence of specific behavior from more generalized types of response. At other times it may seem to be mainly a matter of building up larger processes from smaller ones. Actually, development is probably a process in which both differentiation and integration play a parallel, though not always a coordinate, role.

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[30] O. C. Irwin, "Differentiation of Human Behavior," *Psychological Review*, XXXIX, No. 4 (July, 1932), 390.

[31] L. Carmichael, "The Onset and Early Development of Behavior," in Carmichael (ed.), *op. cit.*, pp. 60–185.

[32] McGraw, *op. cit.*, p. 190.

The effect of specific training varies with the stage of maturation reached by the organism. *Meaning of maturation.* Are there not some forms of behavior, such as walking and stair-climbing, that develop primarily as an inner growth process, and take form largely without specific training? Some psychologists believe so. Gesell, for instance, wrote: "The nervous system grows according to its own intrinsic pattern and thereby establishes the primary forms of behavior. These forms are not determined by stimulation from the outside world. Experience has nothing specifically to do with them. . . ."[33]

More recently Gesell has written: "The so-called environment, whether internal or external, does not generate the progressions of development. Environmental factors support, inflect, and specify; but they do not engender the basic forms and sequences of ontogenesis."[34] Gesell calls this intrinsic growth "maturation." But it is clear that stimulation of some sort is necessary for every form of growth. Therefore, Stoddard and Wellman offer a better definition of maturation as "the expected growth and development of an organism under nutritive and *stimulatory conditions within the normal range.*"[35] (Italics mine.) Maturation, then, from the present writer's point of view, is development that will proceed fairly regularly even in the face of rather wide variations in environmental conditions.

Maturation versus specific training. Several experiments have been performed that purport to show the relative influence of maturation and specific training in acquisition of behavior. Gesell and Thompson gave Twin T of an identical pair "daily training" in stair-climbing for six weeks, beginning at the age of forty-six weeks. During this time, Twin C was deprived of specific training in the function. At fifty-two weeks, Twin T climbed the stairs in twenty-six seconds. "Twin C, at the age of fifty-three weeks, without any previous training, climbed the same staircase unaided in forty-five seconds. After two weeks of training . . . Twin C climbed the stairs in ten seconds. The climbing performance of Twin C at fifty-five weeks was far superior to the climbing performance of Twin T at fifty-two weeks, even though Twin T had been trained seven weeks earlier and three times longer. The maturity advantage of three weeks of age must account for this superiority." [36]

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[33] A. Gesell, "Maturation and the Patterning of Behavior," in Murchison (ed.), *op. cit.*

[34] A. Gesell, "The Ontogenesis of Infant Behavior," in Carmichael (ed.), *op. cit.*, pp. 335–373.

[35] G. D. Stoddard and B. L. Wellman, *Child Psychology* (New York: The Macmillan Company, 1934), pp. 194ff.

There is no space for summarizing other such studies, but the conclusions of most of them have been criticized on one or both of the following grounds: (1) Training was confused with mere repetition or practice; little if any instruction was given as to possible methods of improvement; (2) the controls, although not specifically trained, may have been acquiring other reactions easily transferred to the experimental situation.

There is still a widespread belief, however, that an underlying process of growth, with no more than incidental experience, at least, is responsible for the emergence of certain aspects of behavior, or that such an underlying process must occur before special training or practice or stimulation is likely to be productive. Gesell has stated that, "The role of maturation is most conspicuous in the fetus and infant, but it persists throughout the life cycle until the growth potential completely subsides." [37]

Dependence of training on maturation. Astute training given at the right level of maturation might lead to astonishing acquisition of skill by very young children. McGraw has reported that one of the twins with whom she experimented was introduced to roller skates at the age of 350 days and acquired, at the age of 694 days, or less than two years, reactions that "consisted primarily of the broad, rhythmical body sway which is characteristic of a professional skater." McGraw points out that specific training may be given too early or too late in terms of the maturational pattern. She discovered, for instance, that the most economical time to learn skating is when the baby is just beginning to gain equilibratory control.[38]

Little is known about the placement of educational activities in relation to level of maturation and amount and character of previous experience, but it constitutes one of the most important problems of educational research.

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[36] A. Gesell, in Murchison (ed.), *op. cit.*

[37] A. Gesell, "The Ontogenesis of Infant Behavior," in Carmichael (ed.), *op. cit.*, pp. 335–373

[38] McGraw, *op. cit.*, p. 241.

Although preliminary research indicated that a mental age of six years and six months was necessary for economical learning in reading, later evidence has shown that children with mental ages below that point can learn to read successfully if appropriate methods are used and adapted to the backgrounds of individual children.

In recent years, there has been a tendency to move the grade placement of arithmetic processes upward, presumably deferring them until pupils are more "ready" to learn them or more capable of understanding them. This may have been desirable, to a degree, but it also may well have gone too far. This is suggested, at least, by a recent comparison of the achievement of eleven-year-old pupils in England and California. A test given to pupils in a stratified random sample of English schools was adapted to American use, and given to pupils in a stratified random sample of urban and rural schools in central California. The average scores on a 70-item test of computation and verbal problem-solving were 29.1 for the English pupils and 12.1 for those in California.

An analysis of the placement of the topics of the test in the arithmetic curriculum revealed that many of them appeared at an earlier level in the English schools. Other factors also might have accounted for a part of the difference in achievement, such as the much greater mobility of the California school population; the fact that English schools admit pupils at age five, whereas those in California admit children to the first grade at age six (kindergarten at age five); and so on. But the difference in the age at which children study certain arithmetical processes is undoubtedly one of the principal reasons for the difference found.[39]

Readiness to learn any task is a complex of many factors, the relative importance of which may be different at different stages. These factors include such things as anatomical structure, physiological development, interest and motivation, preparatory learning, richness of previous experience, extent of language development, adequacy of fundamental concepts and meanings, and the setting in which learning takes place. Although it is obvious that there is probably an optimum placement of learning tasks for a given person, it is very difficult to determine the best order. Important as it is, relatively little is known about the problem of curricular sequence in relation to development. The problem is complicated enormously by the fact of great individual differences in rate of development.

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[39] G. T. Buswell, "A Comparison of Achievement in Arithmetic in England and Central California," *The Arithmetic Teacher,* V (Feb., 1958), 1–9.

There are wide individual differences in developmental patterns. That development is a highly individual matter is illustrated by Fig. 7-6, which shows contrasting patterns of development in reading

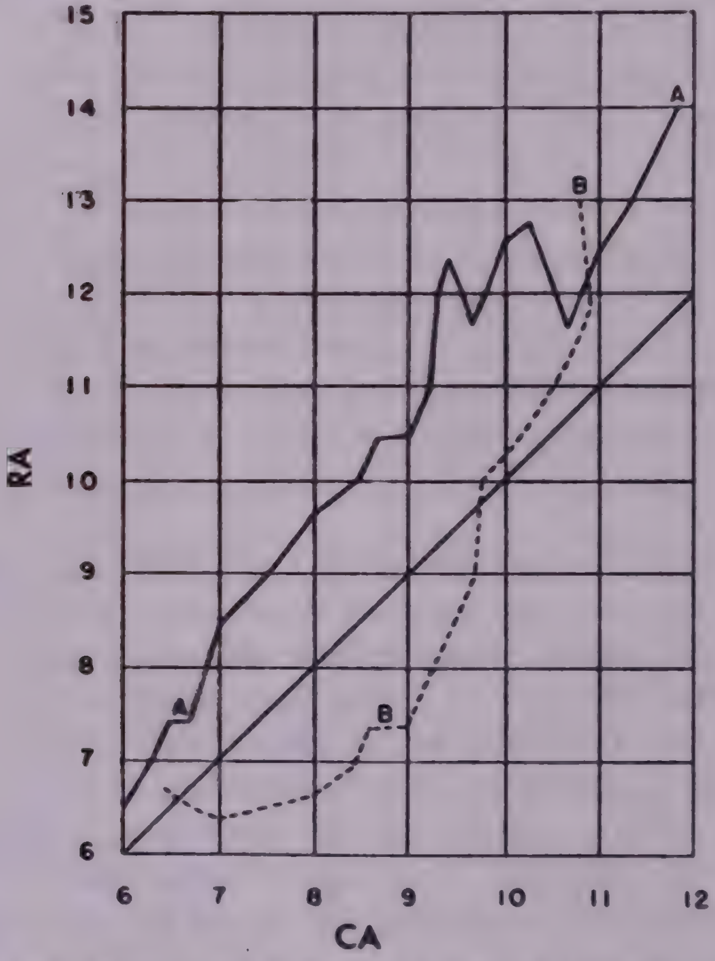

Fig. 7–6. Contrasted patterns of growth in reading in two girls of equal mental ability but unequal total maturity. (Reproduced by permission of the Michigan Education Association.)

ability for two girls of equal mental ability. Although between the ages of ten and eleven the two girls had attained about the same reading age ("A" reached a higher level later), the curves from six on were quite different. Whereas "A" showed rapid improvement from the beginning, "B" got a slow start, and then, at age nine, began to progress rapidly and maintained the spurt until she overtook "A" one and one-half years later. The authors who reported these data also stated that among 56 individual developmental curves in reading, they did not find one of the shape that would be indicated by *average values* or norms.[40]

Individual differences in rate and pattern of growth make it clear that uniform treatment of children at any level or in any subject is unsound. The same learning activities, the same subject matter, or the same teaching methods will not evoke the same responses or achievement from different children at a given time. Furthermore, children are never passive recipients in relation to their environment. They tend to seek out experiences or to reject some forms of stimulation, including teaching. He is a skillful teacher who can adjust curriculum and methods to the particular growth characteristics of individual children.

A review of the nature of development shows the inappropriateness and ineffectiveness of grade classification and of the practice of grouping children in terms of general ability. Children grouped on the basis of mental age may differ widely in reading age. Likewise, children grouped somewhat homogeneously on the basis of reading age may differ widely in their arithmetical achievement. If the teacher resorts to "ability grouping," he will have to classify pupils in one way for one purpose and in different ways for other purposes. Even then, differences in developmental pattern may make common treatment ineffective.

The range of individual differences in a single grade is very great—variations of from six to ten years in reading age in sixth grades have been found, for example. A "strict" promotion standard in which pupils who do not meet a given level of achievement are not promoted does not materially decrease the variability within grade groups. The teacher still has to struggle with the same range of individual differences, and emotional and social problems may be created by children who fall far behind their age group. Neither strict promotion standards nor one or another kind of grouping will eliminate the need for individual treatment.[41]

Finally, it is obvious from developmental data that uniform standards of accomplishment should not be established for all children. Since potentialities differ greatly, the ultimate levels that children may reach will vary accordingly. And since those who finally reach approximately the same level of development may approach it by different patterns, it is unwise to expect all of them to progress uniformly. All children are capable of certain kinds and certain degrees of development, however, and individual achievement should not be measured in terms of common standards, but in relation to individual possibilities and patterns.

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[40] W. C. Olson and B. O. Hughes, "Concepts of Growth—Their Significance to Teachers," *Childhood Education*, XXI (Oct., 1944), 53–63.

[41] W. W. Cook, *Grouping and Promotion in the Elementary School*, (Minneapolis: University of Minnesota Press, 1941).

The child tends to use his abilities spontaneously. Jersild has written that as the child's "...capacities for doing, thinking, and feeling emerge in the process of growth he has an impulse to put them to use." He calls this the principle of *indigenous motivation*, and takes issue with the essentially negative view that motivation is to be interpreted merely as an effort to escape from, or to overcome, irritants and obstacles. Jersild believes, on the contrary, that

> ...living involves a positive striving....According to this view, it is natural to seek, to strive, to struggle toward a kind of self-fulfillment.... The healthy child, like the healthy youth and oldster, is constantly involved in a process of self-realization. This does not mean that he does not deal with irritants and cope with frustrations....The main point is that there is a forward impetus to growth; a growing child seeks to be himself, to discover himself, to realize his resources...for standing independently on his own feet, and also for being deeply involved in interpersonal relations with others. In this process he must risk and venture, and this may mean failure as well as success, painful consequences as well as pleasant rewards.[42]

Instead of simply waiting for what comes, so to speak, the child tends to search, to explore, to seek out new stimuli. In the earlier years of schooling, this eager, often creative, behavior is especially prominent. Many observers, however, have noted that this active interest, this creativity, often wanes as the child reaches the upper grades and the high school. It is doubtful that this change is an inherent aspect of development. It is likely that the school fails to give opportunity for seeking behavior, or fails to reward it, or actually, in some instances, punishes and blunts it. If so, the school checks the impetus to development of the individual's potentialities.

Education as capacity for future development

How during the plastic years, under the guidance of educative procedures, may the individual attain a power of intelligent self-direction that will lead to progressive adaptation to the changing conditions of adult life?

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[42] Jersild, *op. cit.*, pp. 23, 24.

Continued development may be made possible by the acquisition of certain controls of conduct, among which the following would seem to be of paramount importance: (1) permanent interests and attainable, but not too immediate, goals and purposes; (2) economical techniques of learning and unlearning; (3) competence in problem-solving; (4) self-dependence and emotional maturity; (5) attitudes of tolerance of change, of self-criticism, and of open-mindedness; and (6) a mature concept of the self and its possibilities of accomplishment.

The thesis of this chapter is that outcomes such as these are acquired through a process of development. The intrinsic factors in this process are laid down in inheritance, but many of the external factors that will determine the extent to which potentialities will be realized are under the control of teachers and school administrators.

Decline of abilities

It is desirable for man to continue learning throughout adulthood, but is it possible? This question suggests others of importance: At what age do increments in ability of various sorts cease? How rapidly do various abilities of man decline? Is the decline of ability due more to inherent deterioration than to the deleterious effects of undesirable habits, loss of interest, unfortunate attitudes, and the like, acquired by the individual? There is opportunity here merely to outline briefly, and in many instances tentatively, the results of research undertaken to provide answers to the foregoing questions.

Terman originally estimated that, in the average person, mental development as measured by the Stanford revision of the Binet scale ceases at age sixteen, and subsequently concluded that the peak is reached even earlier. Other evidence indicates, however, that when a test capable of revealing increments at the upper levels is used, the peak is more nearly attained somewhere near twenty, or even beyond; a recent investigation indicated a peak of thirty on a verbal, and twenty to twenty-four on a performance measure. The developmental curve of learning capacity plotted by Thorndike (see Fig. 7-7) shows a maximum between the twentieth and twenty-fifth years, and declines thereafter very slowly to age forty-five.

The peak of development and rate of decline probably vary considerably for different abilities. (Some abilities, such as knowledge of vocabulary, may show no decline for a long period.) Thorndike concluded after conducting many experiments on adult learning that the general tendency was a decline of about fifteen per cent between the ages of twenty-two and forty-two.[43] It was estimated that the ability to learn school subjects between the ages of twenty-one and forty-one declined about one-half of one per cent per year. Declines seem to be greater in the kinds of learning done in school, and less in learning situations and activities more characteristic of adult experience. Remoteness in time from formal schooling also affects the results, and timed tests indicate more deterioration than power tests. Such findings suggest that decline in learning ability in adults is due less to loss in sheer capacity than to other factors.[44]

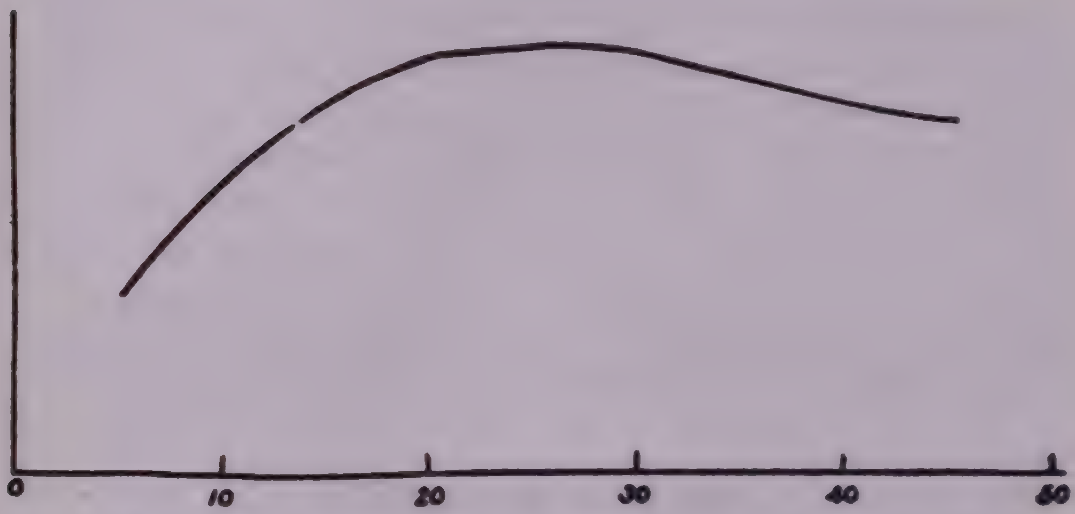

Fig. 7-7. The general form of the curve of ability to learn in relation to age. (From Thorndike, E. L.,* Adult Learning, *page 127. By permission of The Macmillan Company, publishers.)

Thorndike declares that "unless it is counterbalanced by factors acting in the opposite direction, *inner growth* gives the person from twenty-five to forty-five as good an ability to learn as he had from twenty to twenty-five, a better ability than he had from fifteen to twenty, and a much better ability than he had from five to fifteen." He ascribes the reduction in learning by adults primarily to abatement of interest in new adjustments rather than to deterioration in sheer ability.

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[43] E. L. Thorndike, *et. al., Adult Learning* (New York: The Macmillan Company, 1928).

[44] I. Lorge and F. Ruch, "Adult Intelligence," *Encyclopedia of Educational Research* (New York: The Macmillan Company, 1950), pp. 32–35.

The relative effect of inner change and that of habits, sets, and attitudes in accounting for the decline of abilities is not quantitatively known. It is evident, however, that lack of desire to learn, inadequate methods of learning, and interference of old habits and ideas often have, in fact, much to do with the inferiority of adult learning.

Decline appears earlier and more regularly in the more purely anatomical and physiological functions, such as sensory acuity. and is less evident in those predominantly "intellectual." Deterioration shows up more prominently in tasks where speed is an important factor. The old have great difficulty in learning that conflicts with well-established habits or that demands a complex reorganization of them. Memory shows much greater deterioration than imagination and judgment. Furthermore, tests have shown that older persons possess more information, and have a more extensive vocabulary than younger persons. These assets may offset, for some time, the gradual but slow deterioration of sheer learning ability.

The peak of development, and the onset and rate of decline, seem to differ, not only with the type of ability measured, but also with the level of ability of the subjects. Several studies have shown that average intelligence test scores of college students increase over the four-year period. A recent investigation showed that verbal ability may continue to increase well beyond college age in gifted individuals. Some 954 subjects involved in Terman's studies of the gifted—422 men and 346 women—were given the *Concept Mastery Test*, a difficult verbal test, first at average age twenty-nine and one half and again at forty-one and one half. The average scores of both men and women were consistently higher on the second administration, both on the total test, and on the subsections composed of analogies and of synonyms and antonyms. Furthermore, average increases occurred in all the occupations represented (all these occupations were at the professional level) and in all the educational levels (no one of which was below high-school graduation or equivalent), and in all age groups (through fifty).[45]

Another question of general interest is the age at which the most creative work is done. The evidence has been summarized as follows:

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[45] N. Bayley and M. H. Oden, "The Maintenance of Intellectual Ability in Gifted Adults," *Journal of Gerontology*, X (1955), 91–107.

> Data regarding notable achievements show that the best creative work tends to be done early in the prime—in the twenties and thirties—with remarkable poetry and musical compositions appearing sometimes in the teens. In general, creative workers tend to be precocious; and though they often continue productivity into old age, later work is likely to be less brilliant than that produced earlier. Also, those who produce most usually begin earlier. . . . Somewhat in contrast, great leadership comes at later ages—military leadership most often appearing in the forties and political and business leadership in the fifties and sixties. And leadership is now tending to come even later—perhaps because of longer life, seniority rules, and the like. Development and change in the nature of abilities through adult life seem clearly suggested. And favoring or handicapping factors in the environment are also shown to be increasingly important.[46]

The aging process has become in recent years a subject of increasing interest and investigation. We are certain to learn much more about the differential development and decline of human abilities. But we already know enough to realize that if they desire to do so, and if they enjoy appropriate opportunities, individuals may continue to perform acceptably in a wide range of abilities and activities into later years, often beyond retirement. One of education's tasks is to provide stimuli to accomplishment throughout the life span.

QUESTIONS AND EXERCISES
for discussion and study

1 Make a study of the ways in which the individual acquires a self-concept.

2 Criticize the concept of "development tasks." Is "tasks" an appropriate term? How have the "tasks" of any period of development been determined? Is the method valid?

3 If development is not unitary, can some of the phases of development, social and emotional, for example, nevertheless be interdependent?

4 Discuss the significance of this quotation: ". . . for most adolescents or young adults, self-actualization involves a real problem of renunciation of parts of the self that can never come to fruition." (L. E. Tyler, *op. cit.*)

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[46] S. L. Pressey and R. G. Kuhlen, *Psychological Development Through the Life Span* (New York: Harper & Brothers, 1957), p. 161.

5 What are some of the far-reaching choices to be made by the individual in the course of his education, and at what points are these choices to be made?

6 Argue the case for or against annual promotion.

7 Design a study to compare changes in intelligence test scores of students who continue their formal education beyond the high school and those who do not.

8 Make a study of the relationship of "social class" and intelligence. What problem do differences in cultural and social status create in intelligence testing?

9 What phases of school organization and management make it difficult to base the pupil's progress on his development?

10 How would you define giftedness? How may giftedness (as you define it) be identified? What educational adaptations for the gifted would you propose?

11 Assume that substantial changes in personality characteristics are found to have occurred among a group of college students between freshman and senior years. Can the changes be ascribed to the college environment?

12 It has been customary to determine entrance to the English grammar school, which (with exceptions that need not be noted here) is the only avenue to the English university, on the basis of an examination at age 11-plus. Evaluate this procedure.

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for further reading

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CHAPTER 8

Physical growth and motor development

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THE GROWTH OF THE INDIVIDUAL from birth to maturity constitutes almost one-third of the normal life span. Genetic studies of the development of children have furnished valuable information about the nature of physical growth and motor development. The child's physical growth, his strength, and his motor development at different age levels can be measured objectively. The materials of this chapter are designed to give the student of educational psychology a better understanding of physical growth and motor development, and to help him view these aspects of growth as integral parts of the total growth and development of the individual.

Growth in height and weight

Cross-sectional or horizontal studies. Most of the early studies of child growth used the cross-sectional method of gathering data about the height, weight, and other measures of a large group of children. This method made use of a single testing of a large group of children of various age levels. The data gathered from these measurements made it possible to construct representative growth curves for a number of different developmental factors. It was from such studies that the early height-weight charts were developed.

The average height, weight, and gain in height and weight may be obtained from cross-sectional data. These averages, sometimes referred to as "norms," serve as points of references for making comparisons The average height of boys and girls reported by Stuart and Meredith is presented in Fig. 8-1, whereas the average weight is given in Fig. 8-2.[1] However, extensive growth studies conducted during the past several decades show that each child's development is unique, and that it must be determined in relation to his own rate of growth rather than on standards based upon group averages. This notion was emphasized in Chap. 7.

There is a relatively even rate of growth in height and weight during the early school years, followed by the preadolescent and adolescent growth spurt. There is evidence, based on cross-sectional data obtained at different periods, that elementary-school children are taller and heavier today than those of a generation or more ago. The averages for height and weight of seven-year-olds attending the University of Iowa experimental elementary school during the course of three decades is shown in Table 8-1.[2] These findings indicate an increase in the mean height of 1.1 inches during the twenty-year period, and an increase in the mean weight of 4.5 pounds during this time.

Table 8-1

Comparison of the mean height and weight of seven-year-olds in three successive decades

Decade of data collected	*No. of pupils*	*Mean height* (inches)	*Mean weight* (pounds)
1920–27	219	47.8	50.6
1930–37	240	48.4	53.1
1940–47	170	48.9	55.1

SOURCE: Meredith, *op. cit.*

Normal weight during childhood. "Normal" weight infers a desirable balance of soft tissues (muscle, subcutaneous tissue, and adipose tissue) on an individual's bony skeleton. This is the weight that should be present under optimal conditions of nutrition, rest, and activity. It is influenced not only by height, age, and sex, but also by living conditions and body build. One of the earliest methods of assessing

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[1] H. C. Stuart and H. V. Meredith, "Use of Body Measurements in the School Health Program," *American Journal of Public Health*, XXXVI (1946), 1365-1386.

[2] H. V. Meredith, "Height and Weight of Private School Children in Three Successive Decades," *School and Society*, LXX (1949), 72-73.

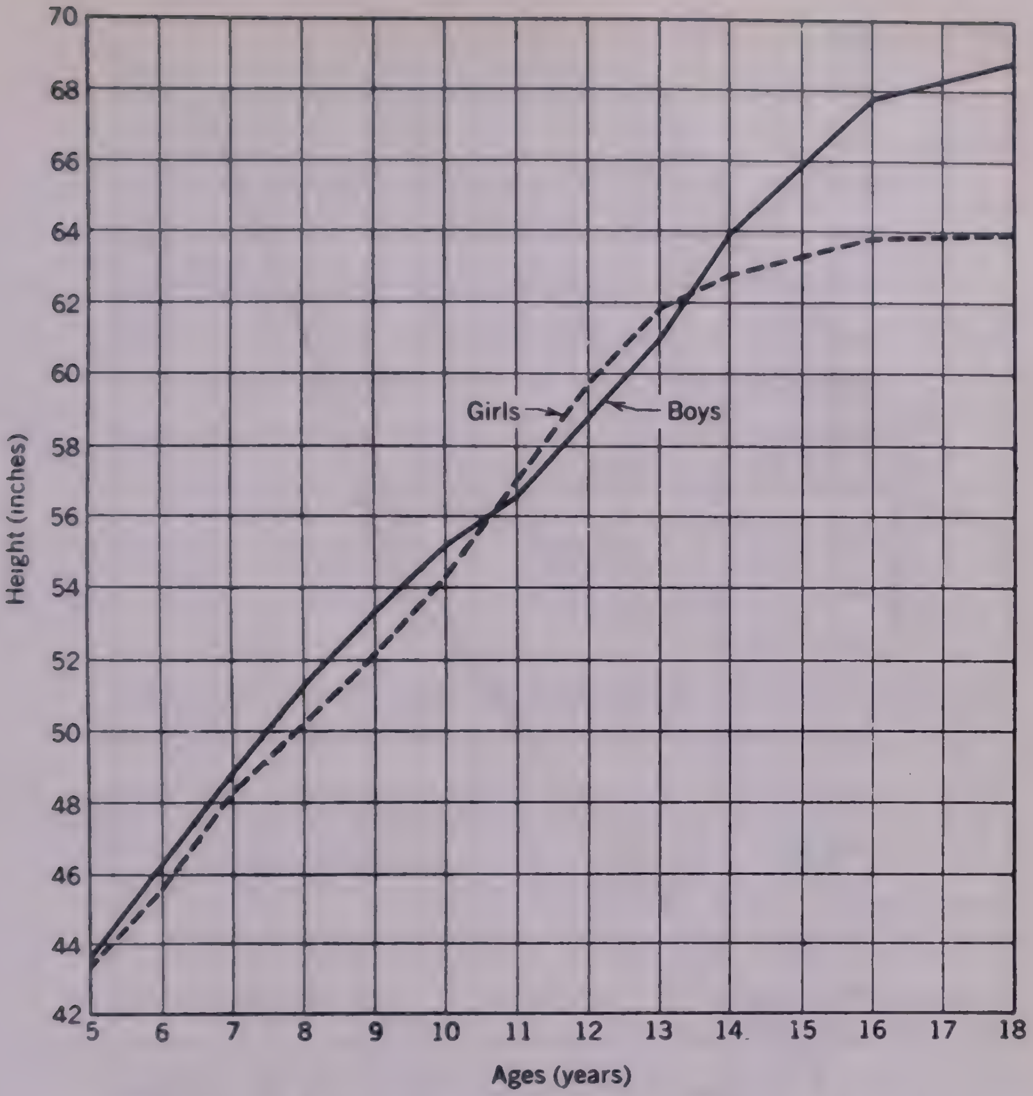

Fig. 8-1. Medium height in inches for boys and girls of north European ancestry, ages five to eighteen. (After Stuart and Meredith.)

normal weight that gained widespread usage in our schools and elsewhere was that of standard tables giving average weights for each sex, age, and height. However, the enormous variation in the rate of growth and in body build of children makes it difficult to judge the desired weight for an individual child in terms of general averages.

A gridlike chart has been developed by Wetzel that takes into account seven types of body build.[3] The physique channels used for

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[3] N. C. Wetzel, "Physical Fitness in Terms of Physique, Development, and Basal Metabolism," *Journal of the American Medical Association*, CXVI (1941), 1187-1195. *A Physical Growth Record for Boys* and *a Physical Growth Record for Girls* has been prepared by the Joint Committee on Health Problems in Educa-

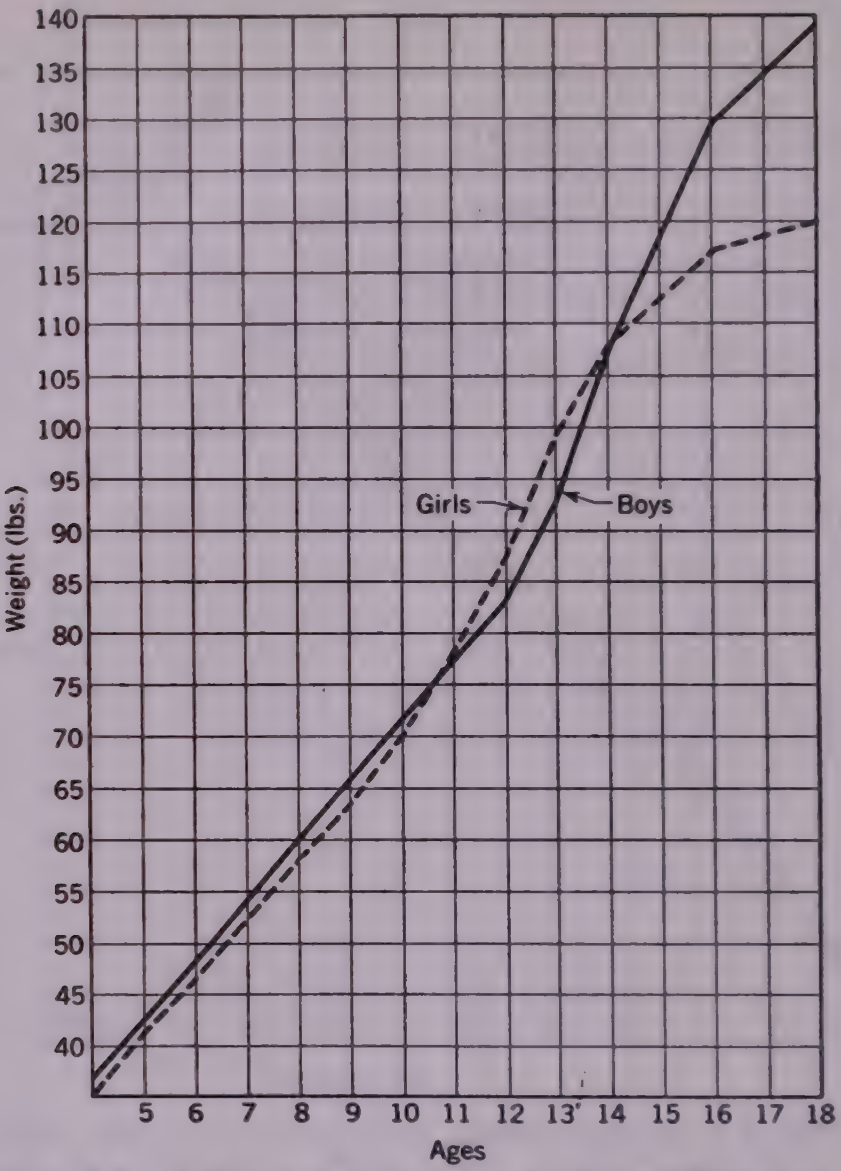

Fig. 8-2. Medium weight in pounds for boys and girls of north European ancestry, ages five to eighteen. (After Stuart and Meredith.)

evaluating physical fitness in terms of body build are shown in Fig. 8-3. Weight is first plotted against height in order to obtain estimates of a child's shape and size; only thereafter is size plotted against age. The size-age relationship identifies the particular channel to which the child belongs at the moment. Such a graph furnishes a continuous basis for determining the rate and direction of a child's physical growth. Growth in height and weight is considered normal as long as the child advances steadily in his own channel.

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tion of the N.E.A. and the A.M.A., using data prepared by H. V. Meredith, of the University of Oregon.

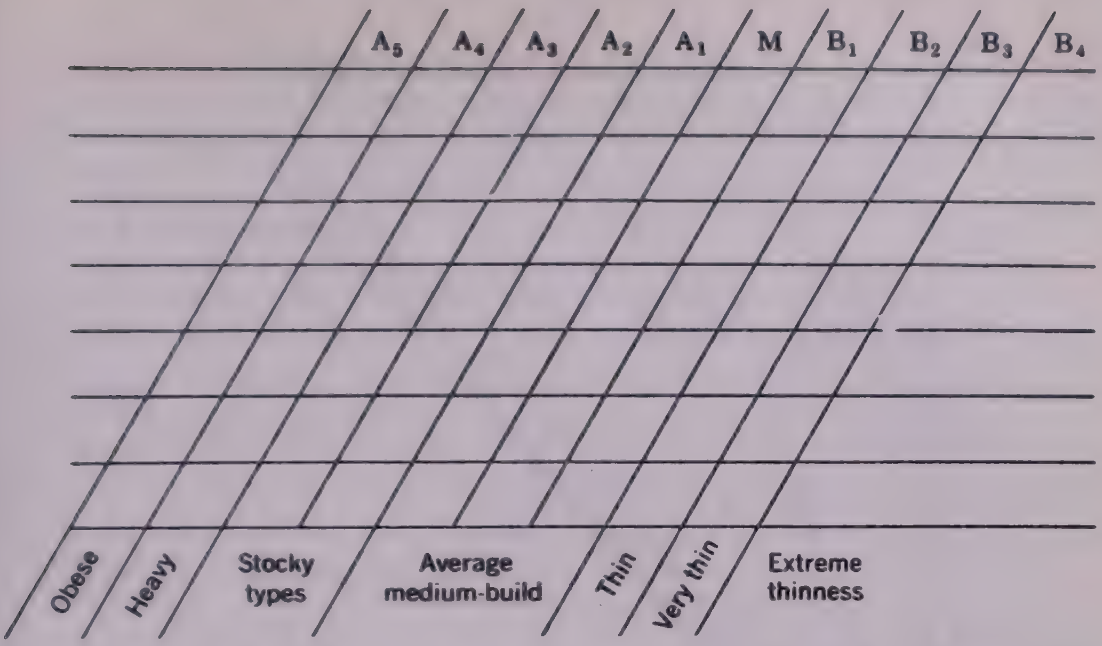

Fig. 8-3. The physique channels used in the Wetzel grid chart for evaluating physical fitness in terms of body build.

Longitudinal studies. The increased interest in child study brought about many long-range studies. Investigators have made use of repeated measurements on the same children. These measurements enabled them to plot individual growth curves for height, weight, and other physical measurements. Although such measurements may not appear to have much immediate value, when kept over a long period of time they have furnished valuable information about the nature of physical growth and the various factors affecting growth. Individual differences in the appearance of certain characteristics are obscured when averages are used. From Fig. 8-4 it can be seen that the average growth curve is rather smooth, whereas each individual growth curve is quite uneven in nature.[4]

Studies of a large number of individual growth curves have given us much information about growing boys and girls. It has been found that:

1. Growth is very rapid from birth to the age of two or two and one-half years of age.
2. Growth continues at a diminishing rate until about two years before the beginning of pubescence.

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[4] H. V. Meredith, "The Rhythm of Physical Growth," *University of Iowa Studies in Child Welfare*, XI (1935), No. 3, 112.

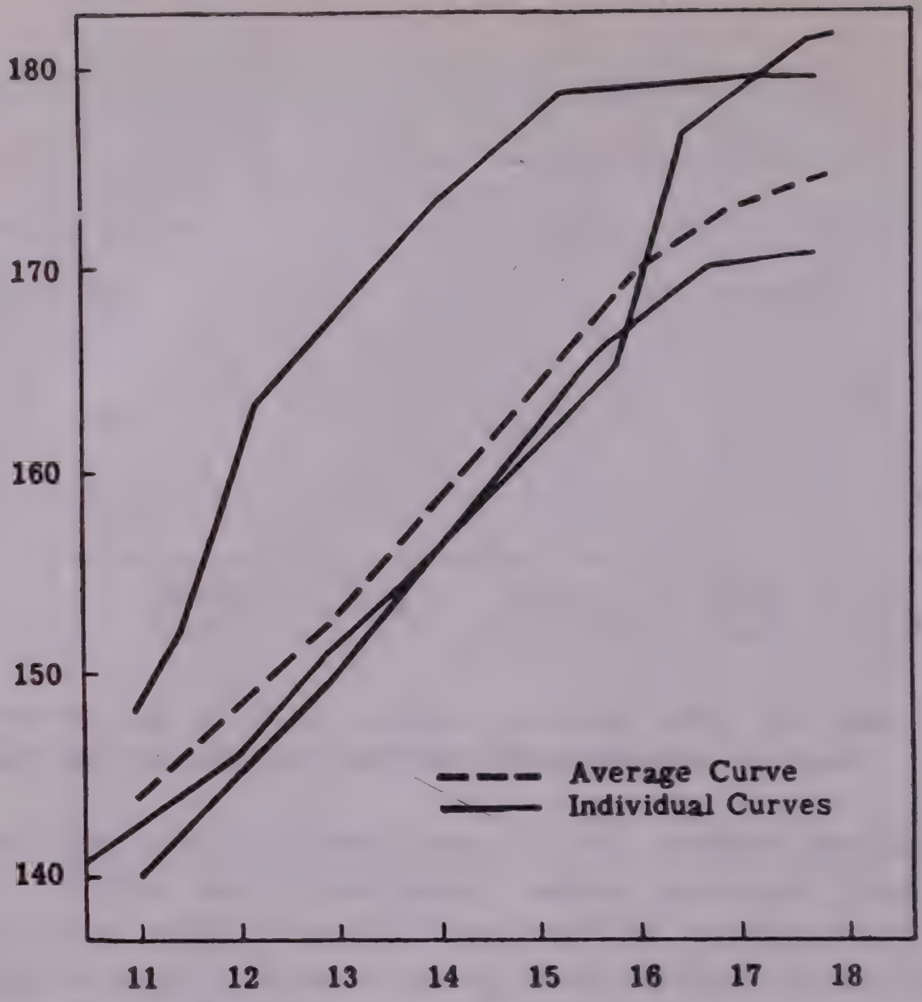

Fig. 8-4. Comparison of average and individual curves for growth in stature. (After Meredith.)

3. Prior to the advent of puberty, a significant increase in the rate of growth appears.

4. Following the advent of puberty, there is a gradual and continuous deceleration of the rate of growth.

5. The shape of the growth curve for both sexes is very similar, but the timing of the adolescent growth spurt tends to disturb the parallelism of the growth curves for boys and girls.

Some special growth features

It has already been suggested that the child grows as a unified whole, and, although growth in height and weight is important, there are other features that must be taken into consideration in assessing physical growth. There are modifications in the internal organs of the body, as well as in the external appearance, that influence the behavior and well-being of the individual child. Changes in the bones, sense organs, organs of digestion, circulatory system, and organs of internal secretion are significant growth features. Some of these are given special consideration in the subsequent discussion dealing with growth features.

Anatomical development. The child's bones contain, relatively, a greater amount of water and a smaller quantity of mineral matter than do those of the adult. The ligaments and joints are less firmly knit together. This accounts for their greater pliability. The space between the ends of the bones, as shown by X-ray pictures, is larger when the child is young. This does not mean, however, that the bones of all children develop at the same rate. Individual differences are evident here as in other aspects of growth. Because of the nature of the child's bones, a greater amount of blood flows through them than through the bones of an adult. This characteristic helps to provide for the nutritive needs of the child's bones. It also makes the child more susceptible to bone diseases due to infection.

X-ray pictures of the bones of the hand and wrist have been used frequently for evaluating the skeletal development of children. These show the development of the ends of the bones, the epiphyses, the relative size of the different bones, and the progress toward the development of the ligaments and their attachment to the bony structures. After five or six years of age, girls show more advanced bone development than boys. The stage of anatomical development of a child can be determined by means of the *anatomic index.* An index of 10 indicates that 10 per cent of the area of the wrist shows ossification. At the age of thirteen, about 70 per cent of the area of the girl's wrist shows ossification. A more recent method of assessing anatomical or skeletal maturity utilizes the pattern of ossification of the epiphyses, rather than a percentage of ossification of some specific area.

The eruption of the child's permanent teeth has also been used to indicate the stage of anatomical development. Dental age scales have been developed for boys and girls. The average number of permanent teeth erupted at the different age levels is shown in Fig. 8-5.[5] Most children will have their baby teeth by the time they are two and one-half years of age. No more teeth will come, then, until near the end of the fifth year, when the permanent teeth begin to appear. The growth of the permanent teeth requires a longer period of time. The curve of growth follows the patterns set forth for height and weight, with the girls ahead of the boys at all stages until all the permanent teeth appear.

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[5] C. E. Palmer, H. Klein, and M. Cramer, "Studies of Dental Caries III. A Method of Determining Post Eruptive Tooth Age," *Growth,* II (1938), 149-158.

There is ample evidence to show that the anatomical development of children furnishes a sound basis for determining their general physical development and for predicting their mature size. Bayley concludes from studies at the Institute of Child Welfare, University of California:

> When expressed as per cent of a child's eventual natural size, his growth is seen to be very closely related to the development and maturing of his skeleton. . . . It appears that growth in size is closely related to the maturing of the skeleton. At a given skeletal age we may say that a child has achieved a given proportion of his eventual adult body dimensions. Consequently, mature size can be predicted with fair accuracy if a child's size and skeletal age are known.[6]

Ears and eyes. The ears and eyes are extremely important in connection with the educational growth of children. There is ample evidence for the conclusion that defective vision and hearing handicap the child in the acquisition of knowledge and understanding of the outer world in which he lives. The child's impressions of the world about him are made possible through stimulations received by the sense organs. Since the eyes and ears are so important for the child's learning, teachers and others should be concerned about their development and protection.

At birth the child's ears are fairly well developed. The major difference between the ears of the child and those of the adult, apart from differences in size, is in the Eustachian tube, which connects the ear with the throat. In the small child this is a short passage that makes the ear especially subject to infection from sore throat and colds. Therefore, every precaution should be taken to prevent throat infection, which might have an adverse effect upon the child's hearing. Also, teachers should be alert to hearing deficiencies and should understand the educational and psychological needs of the hard-of-hearing child.

The development of binocular vision is closely related to reading readiness. There is a grave danger in forcing the child to use his eyes

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[6] N. Bayley, "Skeletal Maturing in Adolescence as a Basis for Determining Percentage of Completed Growth," *Child Development*, XIV (1943), 44-45.

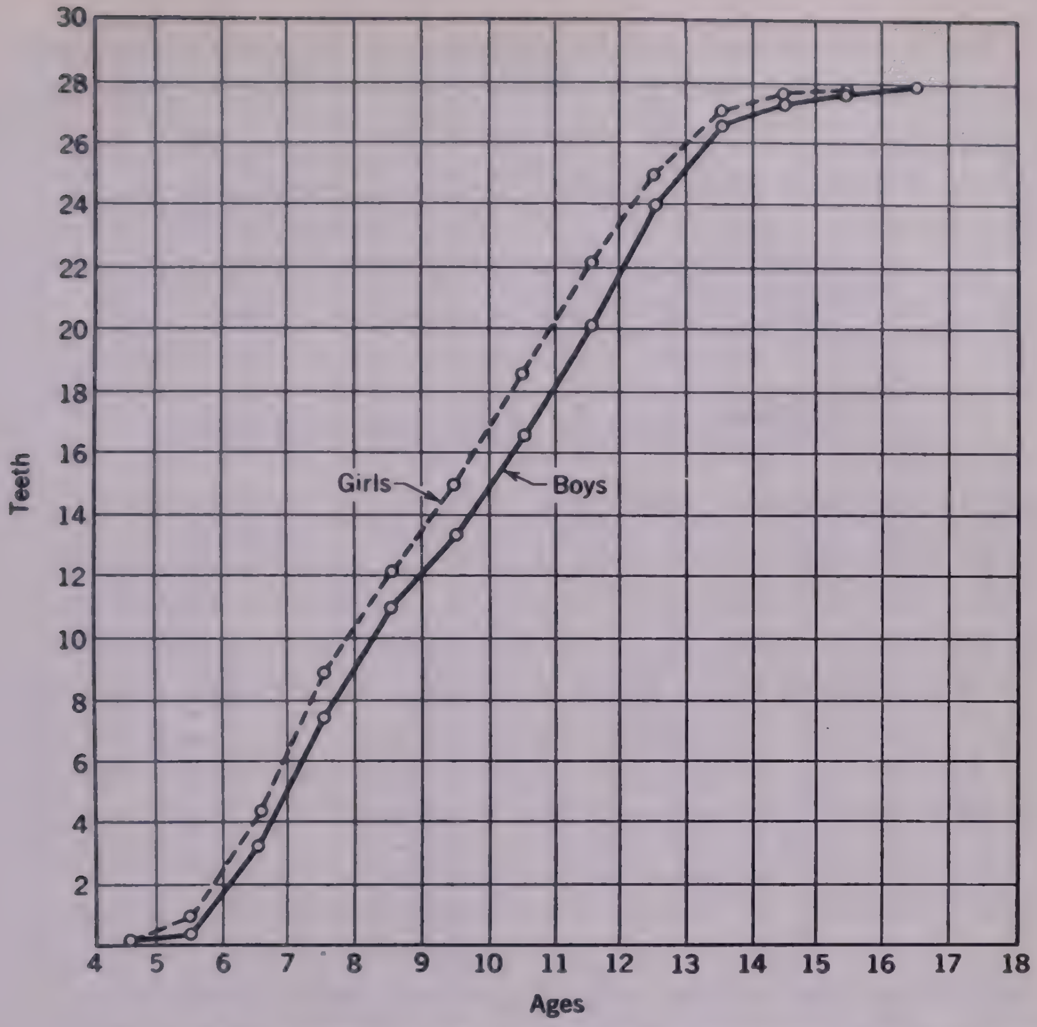

Fig. 8-5. Average number of all permanent teeth (except third molars) erupted at specified ages.

for close vision, such as that required in reading, before the muscles of the eyes have developed sufficiently to enable him to coordinate the eyes without undue strain.

The circulatory system. The growth of the heart and lungs, like that of other organs of the body, follows a course of its own. During most of childhood, boys' hearts are a little larger than girls'. However, from the age of nine or ten to thirteen or fourteen girls' hearts are usually larger than boys'. After the age of thirteen boys' hearts continue to grow at a rapid pace, whereas girls' hearts grow very slowly. The veins and arteries do not follow the same growth pattern as that of the heart.[7] Prior to adolescence they grow rapidly, whereas they show little growth during adolescence, when the heart is continuing to grow. Changes in the size of the heart relative to the arteries are reflected in changes in blood pressure. During early childhood, there is little difference between the sexes in blood pressure, but between the ages of ten and thirteen blood pressure is higher in girls than in boys. After the age of thirteen the blood pressure of boys exceeds that of girls, the difference increasing with age.

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[7] See M. M. Marsh, "Growth of the Heart Related to Bodily Growth during Childhood and Adolescence," *Journal of Pediatrics*, II (1953), 382-404.

Differences in rate of growth

Lack of uniformity. Although students of child development emphasize the basic principle set forth in Chap. 7 that the child grows as a unified whole and functions as a unit in any activity, it is recognized that the various traits, characteristics, and parts of the body do not grow at a uniform rate. Boynton presents thirteen measurements of growth increments for anthropometric characteristics based on retests from five and one-half to sixteen and one-half years of age inclusive.[8] His data show that although the five-and-one-half-year-old boy is 65 per cent as tall as he probably will be at seventeen and one-half years, he weighs only 33 per cent as much and has only 18 per cent of the strength of grip he will possess twelve years later. With respect to weight and strength of grip, the average five-and-one-half-year-old girl has approximately one-third the development she will have at seventeen years of age, but in the case of height, shoulder width, and ankle circumference, she has approximately three-fourths of her ultimate development. Although the average girl is not completely developed physically in some respects at seventeen and one-half years, there are certain aspects of her growth that are completed by the age of fifteen and one-half years.

Individual differences in growth. The range in height and weight of a group of school-age children at a given chronological age will vary enormously. This was indicated in the study by Stuart and Meredith. Whereas the median height of six-year-old boys was 46.3 inches, there was a variation of 5.1 inches between the tenth and the ninetieth percentiles. There is not only a wide variation in height and weight for a group of boys and girls at a particular age level, but also important differences in the growth curves. This may be observed in the individual growth curves for height shown in Fig. 8-4. Some boys will show a spurt in growth as early as nine or ten years of age, whereas the growth spurt will appear in others as late as fifteen or sixteen years of age.

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[8] P. Boynton and J. Boynton, *Psychology of Child Development* (Minneapolis: Educational Publishers, Inc., 1938), p. 114.

There have been a number of interesting studies of possible racial factors in physical development. Weiner and Thambipillai studied West African Negro children and found that they were delayed an average of sixteen months in skeletal ossification and maturation. They attributed this retardation to nutritional, health, and climatic factors. Studies of Guamanian children and other groups of underprivileged children have confirmed the conclusions reached by Weiner and Thambipillai,[9] namely, that exogeneous rather than endogeneous factors are responsible for the retarded physical development of children from certain racial or national groups. In findings closely related to these, Meredith found North American boys from the professional and managerial occupational homes to be, at seven years and at ten years, one inch taller and three pounds heavier than those from homes of semiskilled and unskilled workers.[10] This study confirms the results of other studies relative to the effects of socio-economic factors upon physical growth and development.

Studies by Dupertuis and Michael[11] and by Acheson and Dupertuis[12] reveal a relationship between body build and rate of skeletal maturation in boys. It has been noted that those who are predominantly of a rugged, muscular build grow more rapidly than those whose physique is more finely and delicately constructed, but that the latter group is, on the average, taller as adults. This finding is consistent with earlier observations by Shuttleworth, in 1937, that slow physical maturation during adolescence is associated with greater than average adult height, and rapid maturation during the same period with shortness of stature.

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[9] J. S. Weiner and V. Thambipillai, "Skeletal Maturation of West African Negroes," *American Journal of Physical Anthropology*, X (1952), 407-418.

[10] H. V. Meredith, "Relation between Socio-Economic Status and Body Size in Boys Seven to Ten Years of Age," *American Journal of Diseases of Children*, LXXXII (1951), 702-709.

[11] C. W. Dupertuis and N. Michael, "Comparison of Growth in Height and Weight between Ectomorphic and Mesomorphic Boys," *Child Development*, XXIV (1953), 203-214.

[12] R. M. Acheson and C. W. Dupertuis, "The Relationship between Physique and Rate of Skeletal Maturation in Boys," *Human Biology*, XXIX (1957), 167-192.

When we consider these conclusions about the relationship of physique and skeletal maturation, along with results from studies of the relationship of socio-economic status and skeletal maturation, the findings become very confusing. The relationship between physique and rate of maturation is presumably genetically determined. All the evidence suggests that adverse environmental conditions slow down the rate of growth and reduce final adult height. Acheson and Dupertuis concluded: "Thus, upon the basic genetic tendency for slow maturation to be associated with great adult height is superimposed environmental tendency for slowed maturation to be associated with stunted adults [the word "stunted" being used in a comparative sense]. . . . [I]t is unfortunately impossible, at the moment, to distinguish between the naturally slow maturer and the slowed maturer."

Sex differences. It was pointed out earlier that girls are more advanced than boys throughout the elementary-school years in their physical development. However, when the growth curves of boys and girls are compared a striking similarity may be noted in the growth pattern. Perhaps the most striking sex difference lies in the chronological age at which boys and girls reach the period of maximum growth, known as the preadolescent growth spurt. Girls reach this stage of their physical development and ultimate physical maturity considerably earlier than boys. When the growth rates for different parts of the body are compared, we note that boys are larger than girls in thoracic circumference and girth of forearm, whereas girls have a larger thigh. These and other growth characteristics of boys and girls may be noted throughout the growth period and have an important bearing on sex differences in motor development.

The existence of sex differences in basal oxygen consumption rate has been demonstrated by a number of students of this problem. Basal metabolic determinants were reported by Garn and Clark[13] on 76 boys and 65 girls, under morning fasting conditions. The pattern of sex difference in oxygen consumption was found to be consistently higher for boys than for girls, with the differences becoming more pronounced after the age of eleven years. These differences are significant and may account in part at least for the greater activity of boys in comparison to that of girls.

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[13] S. M. Garn and L. C. Clark, "The Sex Difference in the Basal Metabolic Rates," *Child Development*, XXIV (1952), 215-224.

Motor development

A child's motor development—his development of strength, coordination, speed, and precision in the use of his arms, legs, and other body muscles—is a very important feature in his total development. It has been stated that motor development is a handmaiden of mental development. The child experiments, explores, and satisfies much of his curiosity by way of motor activities. In the same manner, motor behavior serves as a vehicle for a large share of the child's social contacts and his learning of ways of cooperating with others. Motor development also has an important bearing on a child's emotional behavior, since a child's strength, speed, coordination, and skill very often determine whether he will succeed or fail in certain undertakings. How motor skills are learned is discussed in Chap. 18.

Growth in general body control. The sequence of achievements through which a child moves as he acquires the ability to reach, grasp, and manipulate an object with his fingers or the ability to walk illustrate many important phases of development. The acquisition of the ability to walk alone is only a part of a larger, continuing process of motor development. As soon as he learns to walk he begins to incorporate elements of walking into larger and more complex patterns of motor behavior. Through maturation and practice he gradually develops better balance and a smoother gait of walking. This is followed by the ability to run. Sliding, climbing, and hopping develop as a result of maturation and practice.

A study of the motor development of nearly 2,000 children from two to seven years of age showed that climbing stairs, low inclined planks, packing boxes, jungle gyms, and the like, were well established as skills at three years of age in half of the children.[14] After this age there was a steady increase in climbing ability. During the early stages it was noticed that climbing up was somewhat easier than climbing down. No difference was observed in the ease of accomplishing these tasks after they were once mastered.

Skill in hopping on one foot, skipping, and jumping may be developed during the preschool years if children have the opportunity to practice such skills. Gutteridge reports that 42 per cent of her group of three-year-olds rated good at jumping, whereas 72 per cent were rated skillful at four and one-half years of age. Skipping is a skill that few children are able to do at four years of age; at five a relatively large percentage are able to skip, whereas by the age of six most children are able to do so. The ability to hop on one foot develops more slowly, although the majority of children are able to hop by the time they are six years of age. Even at this age the range of ability to hop is very wide.

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[14] M. Gutteridge, "A Study of Motor Achievement of Young Children," *Archives of Psychology*, No. 244 (1939).

Growth in motor ability. As the body develops and changes, new motor learnings are needed. The change in the amount and distribution of weight makes it necessary for the growing boy and girl to make new adjustments in maintaining balance. Also, the development of motor coordination does not keep pace with the rapid growth of the limbs of the body. When the twelve-year-old girl's arms and legs have about reached the full length they will be at maturity, she finds herself breaking dishes and displaying awkwardness in many situations. This clumsiness in motor activities, in light of the fact that she has developed considerable confidence in her ability to perform certain motor skills, is most disconcerting, especially if adults criticize or laugh at her clumsiness.

The *Lincoln-Oseretsky Motor Development Scale*, consisting of 36 items, was developed and standardized by William Sloan.[15] This scale represents an extensive revision of Oseretsky's original scale, designed to measure motor development of school-age boys and girls. The normative data for the scale were secured from administering the test to 380 boys and 369 girls, between the ages of six and fourteen years. The nean scores for boys and girls at the different ages are shown in Table 8-2. Although these norms should not be looked upon as applicable to all groups of boys and girls, they do indicate a continuous increase in motor ability with age.

Although motor development is progressive from age to age, there is a wide range within each age group and considerable overlapping between the different age groups. For example, the range in raw scores for the six-year-old groups on the scale was from 5 to 60, whereas that for the seven-year-old group was from 25 to 80, with 15 per cent of the seven-year-olds scoring below the median of the six-year-olds. Complex skills grow out of simpler skills and appear later in the child's development. Furthermore, they show very wide variations in the time of their appearance for different children. It appears that gross motor skills develop largely as a result of maturation, whereas complex motor skills depend upon practice, especially after the child has reached the elementary-school age.

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[15] W. Sloan, "The Lincoln-Oseretsky Motor Development Scale," *Genetic Psychology Monographs*, LI (1955), 183-252. The scale is available from C. H. Stoelting Co., 424 N. Heran Ave., Chicago, Ill.

Table 8-2

Mean scores of boys and girls on the *Lincoln-Oseretsky Motor Development Scale*

	Males		*Females*	
Age*	Mean	S. D.	Mean	S. D.
6	32.53	16.12	33.33	14.55
7	56.74	15.64	49.95	15.18
8	65.39	15.71	64.85	17.67
9	81.39	15.07	67.74	16.91
10	89.05	20.69	84.66	18.47
11	106.48	17.47	98.77	19.36
12	112.83	21.30	114.10	18.69
13	123.63	11.05	127.81	17.07
14	130.81	11.35	130.83	8.67

* Age 6 means 5-6 to 6-5.
SOURCE: Sloan, *op. cit.*

Sex differences. A comparison of the scores of boys and girls on the *Lincoln-Oseretsky Motor Development Scale* reveals no consistent sex difference favoring either sex. A study by Jenkins,[16] which included running, jumping, hopping, and accuracy of throwing on the part of children ages five through seven, yielded results favoring boys, who were slightly larger during these years. The results presented in Table 8-3 show, however, that, in the case of hopping, girls are superior at each of the three age levels. The superiority of girls in hopping is supported by a study reported by Carpenter,[17] on children of ages six to nine, in accuracy in hopping on a hopscotch pattern. Carpenter attributes the superiority of the girls to the greater amount of practice in this particular skill.

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[16] L. M. Jenkins, "A Comparative Study of Motor Achievement of Children Five, Six, and Seven Years of Age" (Contributions to Education, No. 414 [New York: Teachers College, Columbia University, 1930]).

[17] A. Carpenter, "Tests of Motor Educability for the First Three Grades," *Child Development,* XI (1940), 293-299.

Children in our modern technological age ride and sit far too much. This is reflected in results of recent studies that indicate a lack of muscle tonus and physical fitness of a large percentage of children and adolescents. The development of physical fitness was studied by Jokl and Cluver [18] among a group of children five to twenty years of age. No difference in performance was found among the different racial groups, although constitutional factors as well as environmental conditions appeared to influence the development of efficiency or physical fitness. In the case of endurance, measured by the 600-yard run, both boys and girls improved from six to thirteen years of age. The improvement in physical fitness up to thirteen years was about the same for both sexes, but after this stage of development boys continued to improve, whereas the girls lost in efficiency, so that, in the age range from seventeen to twenty years, the girls' ability was about that of the six- to eight-year-old girls. This decline in efficiency among the

Table 8-3

Average scores obtained by five-, six-, and seven-year-old boys and girls in motor performances

	Five-Year-Olds		*Six-Year-Olds*		*Seven-Year-Olds*	
	Boys	Girls	Boys	Girls	Boys	Girls
Vertical Jump (distance in inches)	2.52	2.22	4.02	3.48	4.98	4.28
Running Broad Jump (distance in inches)	34.40	28.60	45.20	40.00	58.89	50.80
Standing Broad Jump (distance in inches)	33.70	31.60	39.30	38.00	42.40	41.00
Thirty-Five-Yard Dash (time in seconds)	9.30	9.70	8.52	8.84	7.92	8.02
Fifty-Foot Hop Without Error (time in seconds)	10.82	10.33	9.20	8.89	8.81	7.59
Baseball Throw (distance in feet)	23.60	14.50	32.80	17.80	41.40	24.40
Baseball Throw at 10-foot Distant Target (error in inches)	8.87	16.90	5.40	13.17	4.28	8.50

SOURCE: Jenkins, *op. cit.*

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[18] E. Jokl and E. H. Cluver, "Physical Fitness," *Journal of the American Medical Association*, CXVI (1941), 2383-2389.

girls was reflected not only in their running time, but was present also in their physical condition as revealed by their pulse rate, respiration, and fatigue. It seems likely that this early decline in motor ability or physical fitness among girls is a result of their habits and practices: that is, girls show an increased interest in social activities at a fairly early age, and a lack of interest in athletics and other forms of muscular activities.

Physical growth and motor performance. The first-grade teacher is concerned with gross motor performances of the children. A knowledge of the sequence of development in gross motor performances and the relationship of this phase of the child's development to physical growth should be useful in guiding the child during the early school years. A study reported by Seils[19] deals with the relationship of physical growth and maturity of primary-school children and their proficiency in performing certain gross motor activities. An analysis of the data in terms of each grade level showed that the mean performance of both boys and girls becomes higher at each grade level, although the correlations between the gross motor skill performances and age, height, and weight were low. A positive relationship was found between gross motor-skill performance and the results of a measure of maturity. When one considers the varied factors that influence motor-skill performances, this relationship between skeletal maturity and gross motor performances, although not great, appears more significant.

Certain skills were selected by Lachtaw[20] as basic to performance in many motor activities for grades four, five, and six. These skills were running, jumping, throwing and catching, striking, and kicking. Selected tests to measure these skills were given to a group of 67 boys and girls in the fourth, fifth, and sixth grades. The results of this study tended to corroborate those of the study by Seils. The relationship between age, height, and weight and performance as measured by these tests was relatively low. Height and weight factors in general showed a lower relationship to performance than did the age factor for both boys and girls.

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[19] L. G. Seils, "The Relationship between Measures of Physical Growth and Gross Motor Performance of Primary-Grade School Children," *Research Quarterly*, XXII (1951), 244-260.

[20] M. Lachtaw, "Measuring Selected Motor Skills in Fourth, Fifth, and Sixth Grades," *Research Quarterly*, XXV (1954), 439-449.

Maturation versus practice. There is considerable evidence that simple skills develop largely as a result of maturation and general practice, whereas more complex skills require direct training. The results of a study by Mattson of the effects of training upon maze-threading showed little difference, if any, as the result of practice when the maze was simple.[21] However, the performance of the trained group was significantly better than that of the untrained upon the more complicated maze pattern, with the superiority of the trained group becoming greater with an increased complexity of the maze pattern. Thus, one should be careful in generalizing from results of studies conducted with simple motor skills.

It might be stated as a fundamental principle that beyond the early years most of the differences in learning complex motor skills—especially the higher initial scores—are a result of the wide range of experiences and differences in motivation found. Where gross motor skills involving the large muscles are involved, differences in strength at different age levels give a significant advantage to older children. Also, the older individual has greater ability to sustain attention and follow directions in the performance of complex motor skills.

Interrelations of motor development. From early childhood and into maturity, motor achievement involves a combination of factors or abilities. These include size, strength, speed, body build, and motor coordination. Some of the more elusive factors or characteristics that influence motor achievement are interest, self-confidence, initiative, fearfulness, and courage.

A problem that has interested a number of students of child growth and development is whether motor ability is general or specific in nature. This problem has been studied through correlation studies involving many kinds of performance. Studies show that children may be quite skilled in one motor performance and still do poorly in other motor performances. Correlations between scores of preschool children in such activities as throwing, climbing, and jumping are usually low, ranging below .30.[22] Carpenter [23] tested children in grades one through three, utilizing a number of measures such as right and left grip, ball throwing, hopping, jumping, and running. She obtained correlations ranging from −.10 to .77. Most of the correlations were between .20 and .50.

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[21] M. L. Mattson, "The Relation Between the Complexity of the Habit to be Acquired and the Form of the Learning Curve on Young Children," *Genetic Psychology Monographs*, No. 13, 299-398.

[22] B. L. Wellman, "Motor Achievement of Preschool Children," *Childhood Education*, XIII (1937), 156-157, 164-165, 311-316.

[23] A. Carpenter, "Tests of Motor Educability for the First Three Grades," *Child Development*, XI (1940), 293-299.

There is, however, evidence of common basic factors in many motor activities. Lerquin,[24] working with boys aged nine to eleven, concluded that, although there is no common factor present in all motor reactions, the basic factors of speed and accuracy appeared in many activities. It seems likely that in complex motor skills certain common factors will appear that contribute to a closer interrelation of abilities.

The fact that motor abilities are not closely related indicate that they are specific in nature, with certain common factors appearing in some motor skills. The role of interest and experience should be recognized as highly important in studying and evaluating a child's "motor ability." Opportunities for motor learning should be varied, so that all children may be able to develop their particular motor aptitudes.

Differences between slow and fast learners. In the learning of motor skills, the question may be raised: Are there any combinations of physical and motor traits that will differentiate between slow and fast learners of motor skills? Using as subjects 100 boys and girls, ranging in age from six to nine years, Jean Smith attempted to answer this question.[25] Each of the subjects practiced the learning skills without individual guidance; each child was also given tests designed to measure motor ability, motor educability, dynamic balance, static balance, speed, flexibility, strength, and kinesthesis. A statistical analysis of the results indicated that there are physical and motor measures that differentiate significantly between the fast and slow learners of motor skill. The tests of physical skill indicate that grip strength was the test that best differentiates the two learning groups in the girls; the balance beam was the best for the boys.

Although age in itself may not be important in motor learning, the studies cited indicate that maturation, experience, and certain physical traits (particularly strength) are significant factors in the acquisition of motor skills during the elementary-school period. However, one should not oversimplify the factors involved in the acquisition of motor skills. The dynamics of the individual child operate at all stages and in all aspects of his development. One six-year-old child will persist in a motor activity in spite of difficulty and failure, while his classmate with equal maturity and opportunity for learning gives up quickly. Materials bearing on the roles of emotions and motivation on behavior and learning will be presented in subsequent chapters.

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[24] R. Lerquin, "Etude Expérimentale sur l'Habileté Motrice," *L'Anné Psychologique*, XXX (1929), 106-143.

[25] J. A. Smith, "Relation of Certain Physical Traits and Abilities to Motor Learning in Elementary School Children," *Research Quarterly*, XXVII (1956), 220-228.

Summary

The great variety of studies of physical growth and motor development have yielded valuable information about the physical development of children and adolescents. By means of cross-sectional studies, averages for height, weight, and other physical growth measures for different age groups have been obtained. These have been used as points of references or norms. Their widespread use led to a number of unsound generalizations, among which are those based upon height-weight charts.

Through repeated measurements made on the same individuals over a period of years, individual growth curves have been obtained. These have furnished useful information about the nature of physical growth from year to year. Although individuals do not grow at the same rate, these curves indicate that there is a general pattern of physical growth.

Studies of motor development indicate that complex motor skills develop out of simple gross motor skills. There is also a sequence of motor development, especially during the preschool years, with a wide range of individual differences at each age level. Some conclusions and generalizations that might be presented about motor development during childhood and adolescence are:

1. Motor development during infancy and the preschool years tends to follow an orderly sequence, although wide variations in development will be found at each age level.
2. The degree of motor development of the elementary-school child is influenced by many factors, particularly maturation and practice.
3. The development of gross motor skills during the elementary-school years is to a marked degree dependent upon maturation and child dynamics.
4. The development of complex motor skills during the elementary-school years is to a marked degree dependent upon practice.

5. Motor-skill development tends to coincide with the growth curve. Early or late physiological maturation affects motor performance.

6. Until puberty, boys and girls compare favorably with one another in many motor skills; after puberty, however, boys tend to excel, especially in the gross motor skills.

The fact that girls are nearly equal to boys or may surpass them in complex activities that do not depend upon gross strength has important implications for education. The school tends to hold to the conventional ideas about what a boy or girl can and should do, even if these notions are contrary to the results of scientific studies relative to the development of boys and girls. Thus, schools have often used policies and developed learning programs that aggravated apparent sex differences rather than capitalized on abilities that both have in common.

QUESTIONS AND EXERCISES

for discussion and study

1 Differentiate longitudinal and cross-sectional methods of studying the growth in height and weight of children. What are the main advantages of each method?

2 Show how individual growth curves may be helpful in evaluating the growth of a child. How do these curves differ from average growth curves?

3 Show how the fundamental principle that the child develops as a unified whole operates in connection with physical and motor development.

4 Trace changes in body proportions from birth to adulthood. What bearings does this have on the development of motor skills at different ages?

5 What problems sometimes emerge as a result of the differential rate of development of boys and girls?

6 Compare the growth curves of boys and girls on different motor skills. What are the educational implications of these findings?

7 What are the results from various studies of the relationship of socioeconomic status and physical development?

8 How can we account for the confusion of results frequently found between age of maturity and stature?

9 List school conditions that are sometimes hazards to the optimum physical growth of children.

10 What conditions in modern living contribute to the lack of physical fitness of children in the United States as compared to that found among European children? What are some responsibilities of the schools in this connection?

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CHAPTER 9

Mental growth and development

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THERE ARE AVAILABLE many studies bearing on the nature of mental growth and intelligence. However, mental processes are so complex that it has been difficult to determine their functional potentialities. In a broad sense, mental development includes the abilities in memory, imagination, language, percepts, concepts, and problem-solving ability. Intelligence tests were developed in the early part of the present century in an effort to measure more accurately the mental abilities and potentialities of children. A vast amount of research has been conducted on the development and use of these instruments. Special materials bearing on this are presented in Chap. 23. The complexity of mental development makes the task of measuring intellectual development a very difficult one. A study of the identifiable factors related to mental growth and development should be useful to the teacher and others, for a better understanding of the mental development of children at different age levels. The materials of this chapter will be especially concerned with the following aspects of mental growth and development:

1. The growth of intelligence
2. Language development
3. The development of concepts
4. The growth of problem-solving ability

Growth of intelligence

Nature of intelligence. Following the development of intelligence tests near the beginning of this century, many studies were conducted in an effort to measure intelligence. The nature of intelligence has challenged the thinking of many investigators. Binet, one of the earliest investigators, described intelligence as directness of thought, capacity for making adaptations, and auto-criticism. Others described intelligence as the ability to adapt to new problems or situations. Terman has defined intelligence in terms of the ability to carry on abstract thinking. Based on results from more recent research studies, a large number of investigators have challenged these definitions.

To arrive at a more accurate notion of the nature of intelligence, we should first distinguish between intelligence as an inherited potential ability and intelligence as measured by intelligence tests. Actually, the only intelligence we know anything about is that manifested in some performance or on some intelligence test. Intelligence as an inborn capacity is to a large degree an abstraction, and is not subject to direct measurement. It might be more accurate to refer to a child's intelligence test score than to his intelligence. Intelligence as used in the subsequent discussions refers to that which is determined from intelligence test scores. Careful studies of the results of repeated tests on the same subject have furnished useful data about the growth of intelligence.

Mental growth curves. The data available about mental growth are based on results of intelligence test scores secured from the same individual or group of individuals repeatedly for a number of years. Freeman reported results from a study in which tests were administered over a period of years.[1] The average mental growth curves for three groups of children who had different degrees of mental ability to start with are presented in Fig. 9-1. These curves show that each group retains its relative position from one age to another. There are, however, wide individual variations in the rate of mental growth.

It will be noted from a study of Fig. 9-1 that the group of children superior at an earlier age remained superior throughout the years of this study, which comprised the school years. One must be careful in generalizing too freely from these data. It was pointed out in Chap.

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[1] F. N. Freeman, "Intellectual Growth of Children as Indicated by Repeated Tests," *Psychological Monographs*, XLVII, No. 212 (1936), 20-34.

7 that children differ in their rate of growth. Because a child develops slowly, it must not be concluded that he is mentally inferior. Neither should it be assumed that if he develops rapidly he is mentally superior. The rate of mental growth of a particular child will depend upon a number of factors, some of which are: (1) the child's pattern of de-

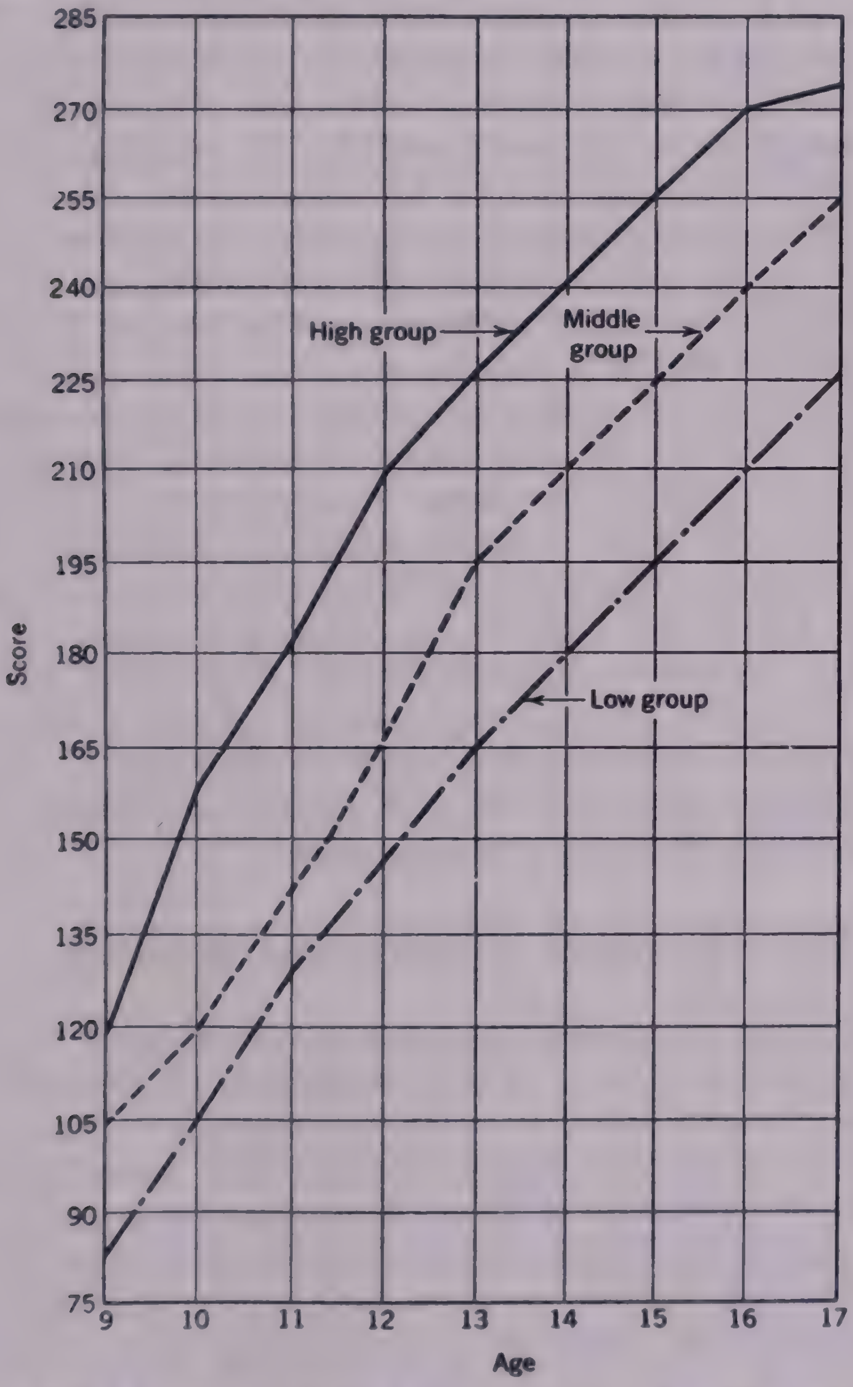

Fig. 9-1. Mean scores for three groups of pupils from eleven to sixteen with consecutive tests. (After Freeman.)

velopment, (2) environmental conditions, (3) psychological and social forces in his environment, and (4) the nature of the test used in evaluating mental growth.

Consistency of intelligence test scores. The problem of the consistency of intelligence test ratings from year to year has been given considerable attention by educational psychologists. This issue has been referred to as "the constancy of the intelligence quotient (IQ)."[2] The central problem involved is whether an adverse environment will lower the IQ or whether a superior environment will raise the IQ.

The concept one has of "intelligence" has an important bearing on the problem of the stability of the IQ. Certainly we cannot hope to raise the level of one's inherited potentialities. Furthermore, it is not possible to measure inborn capacity. However, intelligence test scores may be obtained on individuals based upon the number of exercises or problems they are able to complete in a given period of time. Long-term growth curves of children and adolescents, based on intelligence test scores, show that although there is a relatively high degree of consistency in intelligence test ratings from year to year at the school age for most individuals, significant changes or fluctuations may be observed frequently. The scores of subject number 1541 of Fig. 9-2 illustrate a gradual and stable increase, whereas the scores of subject number 1130 illustrate an irregular increase. Many factors have been assigned to account for these variations. It appears, however, that an explanation must be sought primarily in the nature of the individuals concerned and in the various forces that have affected them in the past and may be currently affecting them.

Mental growth of different functions

Although most of us think of mental growth in terms of general capacity to adjust, to learn, or to solve problems of increasing complexity, psychologists have also found it worthwhile to consider the growth of different mental functions or processes. Studies show that the pattern of development of these different functions is not uniform. The curves of growth of four of the eleven tests of the *Wechsler Intelligence Scale for Children,* presented in Fig. 9-3, show the general trend and pattern of mental growth processes during the elementary-

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[2] The reader is referred to Chap. 23 for a presentation of the meaning of the IQ.

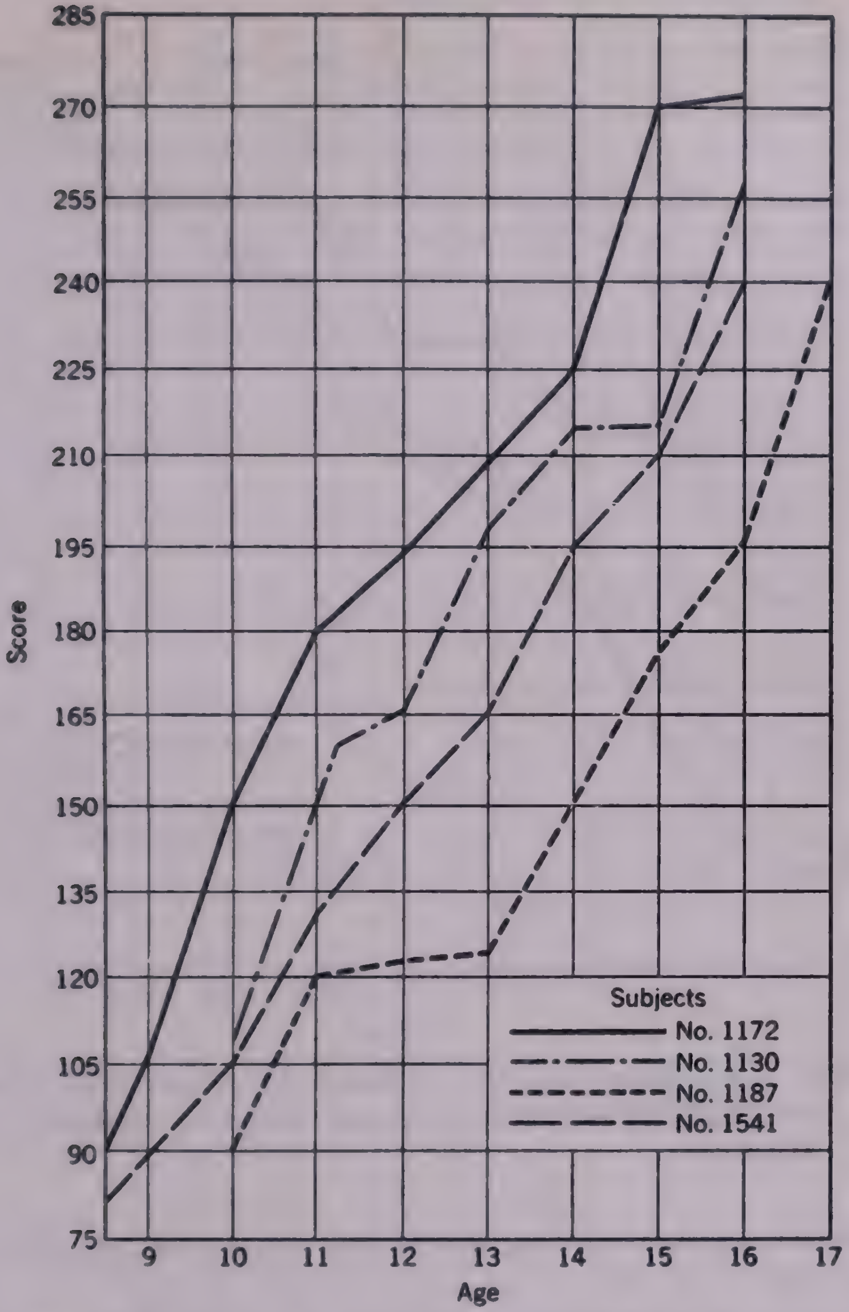

Fig. 9-2. Selected individual mental growth curves. (After Freeman.)

school years.[3] These curves show roughly the proportion of fifteen-year mental maturity attained at the different age levels. The early rate of mental growth for digit span is faster than that for the other processes, since by seven and one-half years a level of maturity is reached that

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[3] D. Wechsler, "Intellectual Development and Psychological Maturity," *Child Development*, XXI (1950), 45-50.

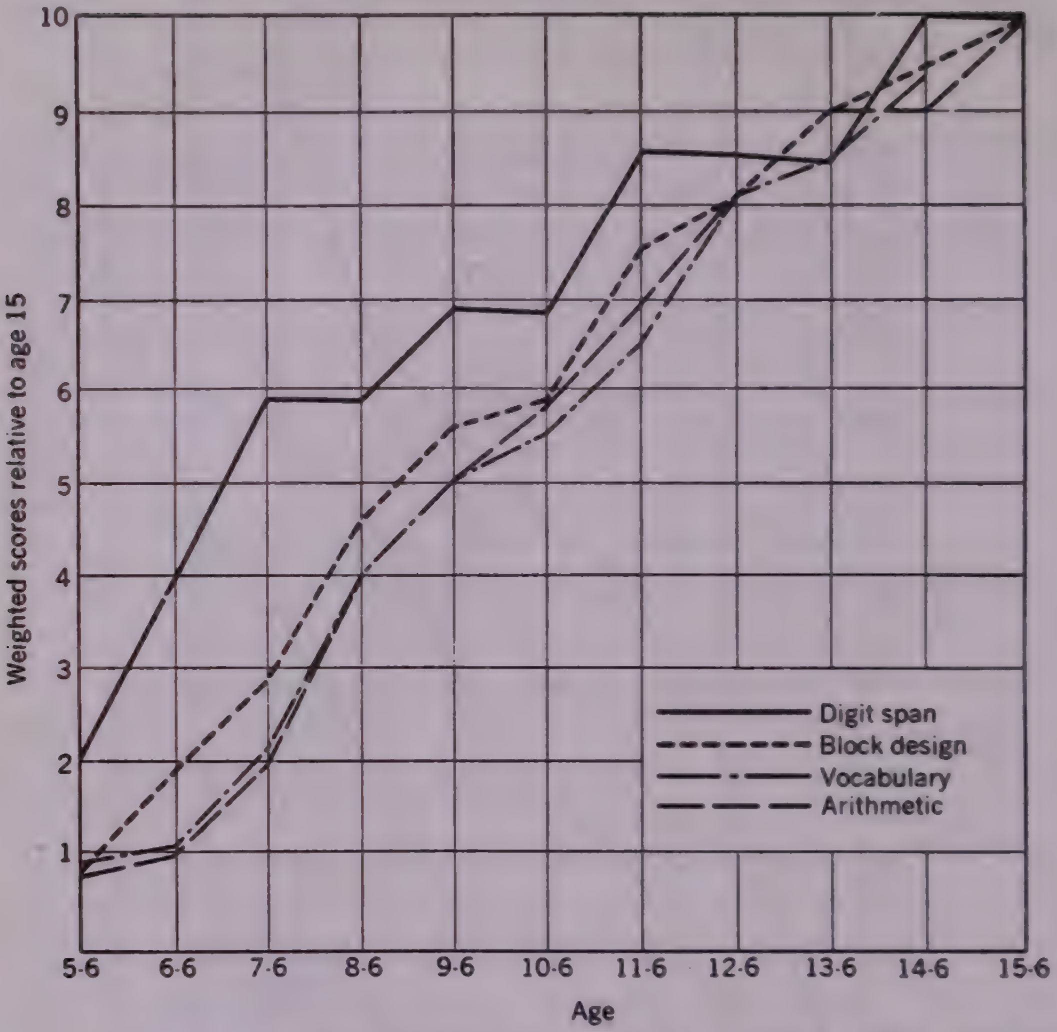

Fig. 9-3. Mental growth as shown by results from four subtests of Wechsler's Intelligence Scale for Children. (After Wechsler.)

is not reached in the other mental processes until the age of ten and one-half years.

Age of cessation of mental growth. When individual tests are repeated from year to year, an increase in ability is usually found. The question may be raised: At what age does this increase in intelligence test scores cease? It was pointed out earlier that the pattern of mental growth is not identical for all individuals. Neither is the pattern the same for all mental functions. Thus, the age of cessation of mental growth will vary with different individuals and with different mental functions.

The age at which individuals cease to grow in intelligence has been estimated from thirteen and one-half years to some time in the twenties or even much later. These differences, obtained by different investigators of this problem, may be accounted for by the differences in mental functions being measured by the tests used for evaluating intelligence. Where *speed* is an important factor, the older or more mature person appears to be at a disadvantage. Where *information* or *logical thinking* is an important function being measured, the older or more mature person may be at an advantage. Freeman and Flory [4] reported results from the Chicago Growth Study in which tests were administered to several hundred children over a period of years. Most of the subjects were retested at the age of seventeen or eighteen years. Some of these were later tested in college. A composite of four standardized tests consisting of (1) vocabulary, (2) analogies, (3) completion, and (4) opposites was used. The growth curves drawn from the raw scores showed that mental development continues well beyond the age of seventeen or eighteen years. There was also some evidence from these data that the children of average ability might continue intellectual growth to a somewhat later age than the brighter pupils.

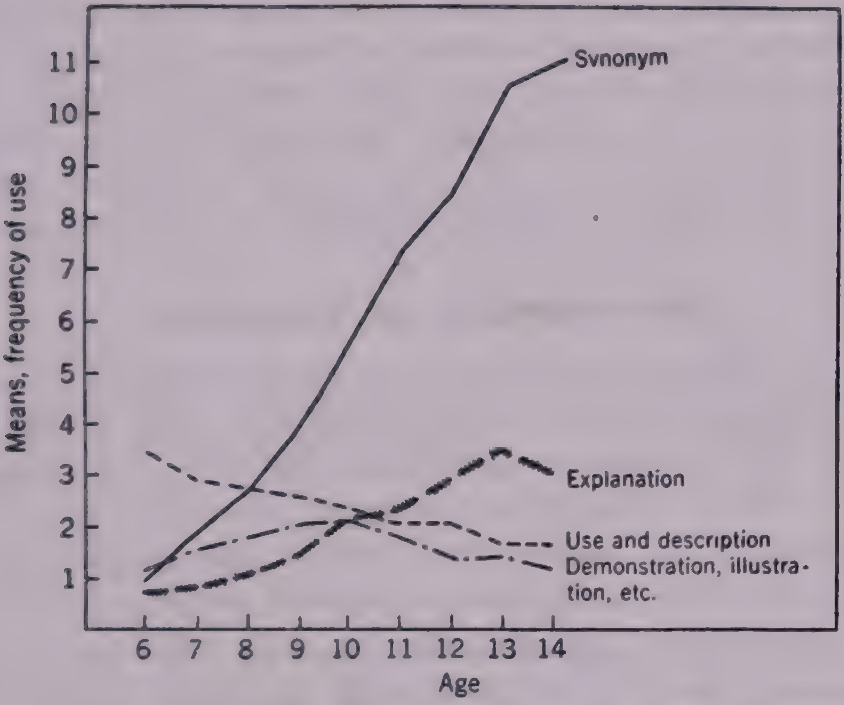

Fig. 9-4. Mean frequency of use of qualitative language categories by age. (After Feifil and Lorge.)

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[4] F. N. Freeman and C. D. Flory, "Growth in Intellectual Ability as Measured by Repeated Tests," *Monographs of the Society for Research in Child Development*, II (1937), 116.

This, however, is in all likelihood a result of the failure of the average environment to present opportunities for stimulation in such a way as to continue an accelerated rate of mental growth on the part of the bright pupil.

The results of the study reported by Freeman and Flory are substantiated by data reported by Bayley.[5] Thirty-three subjects of the Berkeley Growth Study took the *Wechsler-Bellevue Intelligence Scale* at sixteen, eighteen, and twenty-one years of age. The results indicate that intellectual functions continue to improve through twenty-one years and probably beyond. The gains occur at all levels of intelligence found in the sample tested. However, there are indications that some individuals reach their top capacity by sixteen to eighteen years, whereas others may still be growing at the age of twenty-one.

Development of language

Language development on the part of the preschool child furnishes the most interesting and one of the best indices to his intellectual development. The development of language follows the principles characteristic of other aspects of development. It emerges as a result of both maturation and learning and involves both the acquisition of new responses and the refinement of responses already acquired.

Development of comprehensible speech. The development of comprehensible speech takes place during the second and third years of life and reaches a plateau at a relatively early age. Thus, when the child enters kindergarten or the first grade, his comprehensible speech is well established. In studies at the preschool level, it has been noted that there is a relationship between children's language and the socioeconomic status of the home. Rosenthal[6] noted that children of high sociometric status tend toward language characterized by meaningful communication. Their communication is in longer units, with a greater variety of words. No differences were observed in the total number of words used and the relative variability in length of communication units. A number of factors may account for this superiority of the privileged child, one of which is the greater amount of time and guidance given children by parents in higher socio-economic and educational status. Also, there is evidence that children who associate mainly with adults are more precocious in their language development than are children who associate mainly with other children.[7]

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[5] N. Bayley, "Data on the Growth of Intelligence between 16 and 21 Years as Measured by the Wechsler-Bellevue Scale," *Journal of Genetic Psychology*, XC (1957), 3-15.

[6] F. Rosenthal, "Some Relationships between Sociometric Position and Language Structure of Young Children," *Journal of Educational Psychology*, XLVIII (1957), 483-497.

Vocabulary growth. Studies by Terman, Thorndike, and many other investigators have shown that there is a continuous increase in the size of one's vocabulary during childhood. The investigation of children's vocabularies by Seashore[8] furnishes useful information about vocabulary growth during the preschool and early school years. He suggests that a time estimate of a child's vocabulary can only be secured by giving the child an opportunity to display all he has learned from his varied experiences. A new test, consisting of 89 items, developed under his direction, employed the pictorial principle. This was administered individually to 117 children ranging in age from four to ten. Based on the results of this test, the following list of estimated vocabulary sizes was compiled:

Age 4	5,600 basic words
Age 5	9,600 basic words
Age 6	14,700 basic words
Age 7	21,200 basic words
Age 8	26,300 basic words
Age 10	34,300 basic words

Studies of the qualitative aspects of the vocabulary of children at different age levels reveal also a growth in the character of the word definitions. Feifel and Lorge[9] studied the general quality and completeness of word definitions given by children of different ages. The subjects tested consisted of 900 children ranging in age from six through fourteen. The children were slightly above the average in intelligence except for the fourteen-year age level. The vocabulary test of Form L of the *Stanford Revision of the Binet Test* was administered, and the definitions given were studied for their completeness and qualitative nature. The results are presented in graphic form in Fig. 9-4.

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[7] A. J. Brodbeck and O. C. Irwin, "The Speech Behavior of Infants without Families," *Child Development*, XVII (1946), 145-156.

[8] R. Seashore. "A New Light on Children's Vocabularies," *School and Society*, LXVI (1947), 163-164.

[9] H. Feifel and L. Lorge, "Qualitative Differences in the Vocabulary Responses of Children," *Journal of Educational Psychology*, XLI (1950), 1-18.

The children six and seven years of age gave the use and descriptive type of response most often. For example, a response to the word "orange" would be "something to eat." The explanation type of response is used very little at this age, but appears to grow slowly and continuously in use until the twelve-year age level. The synonym type of response, although used very little by the six- and seven-year-olds, grows rapidly in use throughout the following years. The decline in the demonstrational and illustrative type of responses during the twelve-, thirteen-, and fourteen-year age levels may be attributed to the growth in size of the vocabulary and the ability to symbolize things and events in terms of opposites and similarities.

Growth in length of responses. There is not only an increase in the size and quality of the child's vocabulary with age; there are also pronounced changes in the length of each response. The one-word response characterizes the early language behavior. This grows so that by the age of six the individual child is using a large variety of words and almost every form of sentence structure. This development is noteworthy when we consider that it has occurred in such a relatively short period of time.

There is evidence from many sources that growth in language is more rapid on the average for girls than for boys. The data presented in Table 9-1, from a study reported by Heider and Heider,[10] indicate that there is a gradual and continuous growth in the number of words per sentence during the elementary-school years. A further analysis of the data shows that the average length of sentences is longer for girls than for boys. The superiority of girls may also be observed in the clarity of enunciation and in freedom from speech defects.

Table 9-1

Mean number of words per sentence in written composition

Age	*Grade*	*Words per sentence*
8	3	10.2
9	4	10.9
10	5	11.1
11	6	11.1
12	7	12.8
13	8	13.7
14	9	13.9

SOURCE: Heider and Heider, *op. cit.*

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[10] F. K. Heider and G. M. Heider, "Studies in the Psychology of the Deaf," *Psychological Monographs*, LII, No. 1 (1940), 42-103.

Development of concepts

An important aspect of the child's mental growth involves the acquisition of concepts, as will be shown at greater length in Chap. 18. In the development of a concept, it is first necessary for the learner to recognize the essential feature. For example, in the acquisition of the concept of "mountain" the child learns from observing a number of mountains that mountains contain the feature of being higher than the surrounding areas. It is also necessary to vary the concomitants such that special features found in only a particular mountain or group of mountains are eliminated from the emerging concept. A child living near Atlanta had seen Stone Mountain many times. The great mass of exposed granite stood out in his concept of a mountain, since he had no experiences with other mountains. The features common to all mountains must, through a wide range of experiences, be recognized as the quality that characterizes mountains, whereas those features common to particular mountains must be recognized only as special types.

A child normally acquires a number of concepts before entering school. These are, however, rather broad in nature, including such things as automobiles, books, doctors, and schools, without a refinement of these into subclasses. The first-grade teacher takes it for granted that the child has acquired many gross concepts. If the child has not acquired a concept of a particular word, it will be difficult for him to learn the word and he will be unable to grasp the full meaning of a sentence in which the word is used.

The importance of experience. It has been already suggested that a wide range of experience is essential for the formulation of concepts. The results of scientific studies bearing on this problem indicate clearly that actual experience on the part of the preschool and elementary-school child is the most important factor in concept development. However, vicarious experiences are useful at all stages in concept formation. This is borne out by the results of a study by Osburn and others [11] of the concepts of kindergarten children based upon vicarious experiences. The importance of pictures, illustrations, models, and the like, in making more concrete relationships implied in language, is revealed by this study. Children do not readily acquire concepts by merely meeting words in context. Rather, it appears that at all age levels the building of concepts necessitates a certain amount of actual experience.

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[11] W. J. Osburn, M. Huntington, and V. Meeks, "The Language of Relativity as Related to Reading Readiness," *Journal of Educational Research*, XXXIX (1948), 583-601.

When concepts are inadequate or inaccurate, they have an adverse effect upon the child's interpretation of reading materials. This may be noted in connection with a story about fishing. In such a case, the words *perch, cast, line, rod,* and *hook* were used. To children unfamiliar with fishing terminology, these words have entirely different meanings from those implied in the story. *Perch,* which was used as a noun in the story, to such children may be a verb. The word *cast* to these children may mean a group in a play. *Line* to these children is what you draw on a piece of paper to indicate direction or distance, whereas *rod* is a mathematical term. The word *hook* may be interpreted as a verb rather than the object to which a fish becomes attached.

The development of concepts requires a sort of pacing or "seasoning." In order to grasp certain concepts or meanings, it becomes necessary for the child to have an accumulation of experiences distributed over a period of his growth and development. This is quite noticeable in the development of concepts of space, distance, and time. It is also observable in the development of social science concepts, such as the community, cooperation, and political activity.

Perception of space and distance. The perception of space and distance is such a commonplace feature of everyday life that adults are inclined to look upon this as an outgrowth of maturation alone, with little consideration of the importance of experience. Studies show that binocular vision is poorly developed in preschool children. This contributes to their inadequacy in depth perception. To the preschool child, the train, when viewed from a distance, may appear as a toy train. It is through experiences with standard objects in the distance that he comes to learn that objects appear much smaller when they are far away.

The perception for depth is poorly developed in the six-year-old when he enters school. The immature child may be observed placing his cup very close to the edge of the table. He incorrectly estimates the height of things. This may account for a certain amount of awkwardness in handling things.

There is a constant and continuous increase in the verbalized manifestations of the sense of space by children. By the time they arrive at school, they have developed an understanding of the ordinary space and distance words. *In, on, up, at,* and *down* are space words frequently used. Thus, he is able to understand directions on the part of the teacher or others in which space words are used. The statement, "Place the ball on the lower shelf," has meaning for the six- or seven-year-old. However, his perception of space and distance is almost completely limited to his concrete experiences. A more abstract concept of space, such as that used in studies involving maps, the globe, or reading matter, develops slowly during the elementary-school years.

Time concepts. A study by Bradley dealt with the growth of the ability of elementary-school children to understand ordinary time words and the development of a concept of the universal and continuous nature of the time scheme. Four tests were administered to a group of urban school children aged five to thirteen years. The purpose of the first test was to trace the growth of an understanding of ordinary time words used in everyday life, whereas that of the other three tests was to explore the grasp of the child's time scheme extending into the past and the future. In the first test, 30 questions were asked of each child, such as: What is your age? Is it afternoon or morning now? What season is it?

The results shown in Fig. 9-5 indicate a gradual and continuous growth in understanding of time words throughout the elementary-school period.[12] By the age of five years, distinctions between the present, past, and future seem to have been established. The first of the time words used after this stage were those referring to natural phenomena and personal activities. In general, the ability to understand the conventional time scheme and to use particular time words appeared later than was generally believed. Nine- and ten-year-olds were able to comprehend a long period of years. Twelve- and thirteen-year-olds could answer questions that were mainly concerned with duration. The principle of a sequential order of the acquisition of time knowledge was apparent in this study.

Studies and observations of the time concepts of elementary-school children suggest that their background of time concepts is developed largely outside of organized classroom instruction. Adequate time and space concepts are essential, however, for the acquisition and understanding of social science materials. A sound educational program will take into consideration the nature and extent of the development of these concepts at the different age periods.

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[12] N. C. Bradley, "The Growth of the Knowledge of Time in Children of School-age," *British Journal of Psychology,* XXXVIII (1947), 67-78.

Growth in number concepts. One of the contributions of the nursery school and kindergarten is to furnish children with many favorable opportunities for the development of number concepts. Through being with other children and working with different things where numerical terms are used, meanings are gradually developed and become a part of the total self. Many opportunities are available for stimulating the growth and clarification of number concepts. The children working

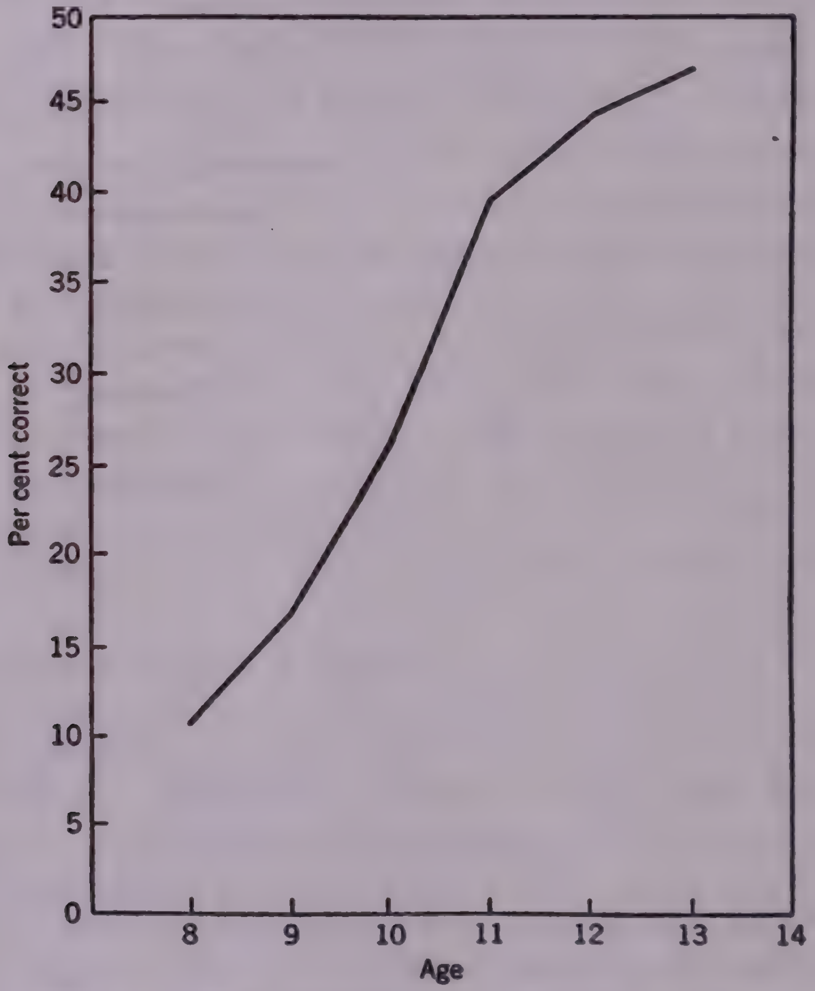

Fig. 9-5. The percentage of correct responses made by different age groups on the temporal absurdity test. (Afer Bradley.)

at a particular table or on a special problem are counted, glasses for orange juice are counted, the number of chairs needed to seat some visitors are estimated or counted, the number who brushed their teeth are counted, and many other situations appear that call for number combinations. Growth in memory ability, experiences with numerical situations, and opportunities for a variety of experiences with numerical problems provide for growth in the child's numerical concepts.

Brotherton, Read, and Pratt[13] studied children's knowledge of indeterminate number concepts through their application of such terms as *hardly, few, some, several,* and *many* to actual groups of symbols. Children were tested at three grade levels: second and third, sixth and seventh, and tenth and eleventh. A reliable increase was noted in precision in the use of these concepts from grades two and three to grades six and seven. However, there was little increase noted from grades six and seven to grades ten and eleven, indicating that these concepts are established with a relatively high degree of precision at the sixth- and seventh-grade levels.

Development of concepts of causal relations. An important aspect of children's thinking is that of the development of their concepts of causal relations. Concepts of causal relationships appear as an aspect of the development of scientific concepts. However, scientific concepts go beyond explanations of causes to a consideration of the nature of proof, a differentiation of facts and opinions, and an understanding of scientific laws.

Two types of analysis of children's causal thinking were made by Deutsche—quantitative and qualitative.[14] Questions of causality were selected and tried out with children. Quantitative scores were obtained from the adequacy of the answer, as an explanation of the phenomenon, to such questions as:

What makes the wind blow?
What makes the frost on the window pane?
What makes water boil?

The mean quantified score increased for each of the questions asked throughout the age range studied—eight through fifteen. However, the increase was greater for some of the questions than for others. These differences were no doubt related to the difficulty of the different questions. Also, individual differences within each age group were very pronounced. Such differences would normally be greater for the more complex questions than for the simple ones. A qualified analysis of the answers revealed important differences. There was a growth with age in the use of logical deductions, and a decline in explanations in terms of the phenomenon itself.

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[13] D. A. Brotherton, J. M. Read, and K. C. Pratt, "Indeterminate Number Concepts #II. Application by Children to Determine Number Concepts," *Journal of Genetic Psychology,* LXXIII (1948), 209-236.

[14] J. M. Deutsche, *The Development of Children's Concepts of Causal Relations* (Minneapolis: University of Minnesota Press, 1937).

Children's concepts in relation to instruction. It was pointed out in Chap. 7 that learning must be geared to the child's maturational level. Teachers often fail to realize the range and limitation of a child's understanding. Part of this stems from the fact that concepts develop gradually. The child's grasp of many topics encountered at school is often quite incomplete. He may use words in proper context without understanding their complete meaning. Causal relations are frequently misunderstood. This was illustrated several years ago when the writer asked an eight-year-old girl where she obtained so many pretty flowers on the same day. The little girl answered by pointing out that her mother planted all the flowers on the same day. The same child may be well informed on some topics and poorly informed on others. Maturation and experience operate together at all stages in the child's development. This notion must constantly be recognized in the evaluation of mental growth of children.

A failure on the part of teachers and others to appreciate a child's lack of understanding can frequently be observed in the teaching and learning of social studies materials. The results of studies by Eaton[15] suggest that the amount of understanding and information sixth-grade children have on many topics commonly studied in the social studies classes is not directly related to the amount of time devoted to such topics at school. The learning of many concepts are vague, because they have been presented before the child has had adequate experience to understand them. Concepts of an abstract nature develop slowly. They can only be understood when they are taught in such a manner that the child can interpret them in terms of his everyday experiences.

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[15] M. T. Eaton, *A Survey of the Achievement in Social Studies of 10,220 Sixth Grade Pupils in 464 Schools in Indiana* (Bulletin 20, No. 3, School of Education, University of Indiana, 1944).

Growth in problem-solving behavior

Although problem-solving will be discussed more fully in Chap. 19, it is presented here in relation to mental growth during childhood and adolescence. Problem-solving behavior is here regarded as those activities involved in trying to reach a goal or solution to a problem situation. The problem situation may vary in complexity from that of the child trying to stack two or three blocks to a situation involving space and time relationships. Differences in the complexity of problem situations have contributed to different explanations of the nature of problem-solving behavior. Robert L. Thorndike has suggested that problems may be divided into two main categories: (1) practical problems, or the need to achieve something, and (2) intellectual problems, or the need for understanding.[16]

Problem-solving of the preschool child. Students of child development have noted that reasoning occurs as early as two and one-half or three years. However, reasoning at this age is confined to concrete and personal things from the child's immediate environment. This is shown in an investigation by Guanella[17] of the development of block-building from two to six years of age, under conditions where there were plenty of blocks and a minimum of adult teaching and interference. Guanella noted that block-building begins around the age of two years, with the "arch" and "representative building" appearing around three years. At first the child names the structure after it is constructed; later he may state what he is going to build before he begins building. Thus, we note that at first the child deals with single blocks, piling one on top of the other one; later he works with block combinations in "representative" building; still later, he makes use of blocks in dramatic play, announcing his intentions before beginning the construction.

Some investigators have attempted to explain problem-solving of preschool children as trial-and-error behavior. Such an explanation may be an outgrowth of the puzzle-like nature of problems used in studying problem-solving behavior of preschool children. It should be noted, however, that children actually show a wide range of behavior in dealing with problem situations, the type of behavior depending in a large measure upon the nature of the problem. Concerning this, Anderson states: "Studies of the behavior of children in problem-solving situations reveal a complete range of behavior from random activity through to the immediate solution with ability to state the principle." [18]

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[16] R. L. Thorndike, *How Children Learn the Principles and Techniques of Problem-Solving,* Forty-ninth Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press, 1950), pp. 192-216.

[17] F. M. Guanella, "Block Building Activities of Young Children," *Archives of Psychology,* XXVI, No. 174 (1934).

Problem-solving of school-age children. Concrete, direct experiences are important to the school-age child's problem-solving activities. However, as he grows older there is a significant increase in his ability to state a problem in words and to verbalize its solution. An important difference in the problem-solving behavior of younger and older children is that the older children recognize the problem as a problem, whereas the younger children tend to emphasize the objects used in the problem rather than the problem situation. This was apparent in a study reported by Heidbreder [19] in which the problem was to find a small celluloid doll concealed in one of two boxes. The children were to solve the problem by responding to different clues presented, such as the design at the top of the box. Heidbreder noted that three-year-olds were concerned only with obtaining the doll from the box, that some four-year-olds appeared to react to the problem as such, and that children six to ten years of age definitely responded to the problem as a problem.

Problem-solving behavior of primary-grade children should not be limited to things about them in their physical environment. There is plenty of evidence from observations of elementary-school children that they are capable of solving problems in the realm of people and human relations. However, the ability to generalize the solution to a problem increases with age and a wider range of experiences, The seven-year-old who is concerned with fair play in games with other children of his block, may, at the age of fifteen, be concerned with fair play on a much larger scale and involving a greater range of activities. It appears, however, that the same mechanisms of problem-solving are to be found at the different age levels. Trial and error, imitation, following directions, logical deductions, and insight appear among preschool, elementary-school, and high-school children and adolescents.

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[18] J. E. Anderson, *Psychology of Development and Personal Adjustment* (New York: Henry Holt & Company, Inc., 1949), p. 190.

[19] E. Heidbreder, "Problem Solving in Children and Adults," *Journal of Genetic Psychology*, XXXV (1928), 522-545.

Problem-solving ability improves with age in terms of both speed and accuracy. Ausupel and Schiff[20] found significant and progressive increases with age in the ability to learn a relevant causal sequence and to inhibit the learning of an irrelevant causal sequence in a teeter-totter problem. The authors concluded that the ability to learn a relevant causal relationship (namely, that the side of the teeter-totter which is farthest from the fulcrum will fall) is a function of age in children. This was a challenging problem for kindergarten and third-grade children. However, sixth-grade children were able to master it directly without an error. Parallel results were obtained with respect to the ability to resist the learning of an irrelevant causal relationship.

Summary

The vast amount of research conducted during the past several decades on the development and use of intelligence tests has yielded valuable information about the mental growth of children and adolescents. Data secured from repeated measurements of the same individuals over a period of years show wide variations in the rate of mental growth. Individuals also differ in the consistency of mental growth throughout the period of childhood. These variations may best be accounted for by (1) individual differences in pattern of development, (2) environmental differences, (3) psychological and social forces, and (4) the nature of the tests used in evaluating intelligence.

Studies of the pattern of development of different mental functions show that these are far from uniform. Where *information* or logical thinking is involved, the older or more mature person is at an advantage. However, some individuals appear to reach their top capacity on the different test items at an earlier age than others. Language development during the preschool and early school years furnishes one of the best indices of a child's intellectual development. There is, however, a relationship between children's language and the socio-economic status of the home. Significant changes take place in the completeness and qualitative nature of the child's vocabulary from age six through age fourteen.

The child normally acquires a number of rather broad concepts before entering school. The exact nature of these concepts will depend largely upon the nature of experiences he has encountered. Concepts of space, distance, and time develop gradually through everyday experiences at home, on the playground, and at school. Growth in memory ability, experiences with numerical situations, and opportunities for a variety of experiences with numerical problems provide for growth in numerical concepts during the kindergarten and early school years. There is a continuous increase in precision in the use of these concepts to grades six and seven. Concepts of causal relations undergo important changes with age, with a pronounced growth in the use of logical deductions and a decline in explanations in terms of the phenomenon itself.

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[20] D. P. Ausupel and H. M. Schiff, "The Effect of Incidental and Experimentally Induced Experience in Learning of Relevant and Irrelevant Causal Relations by Children," *Journal of Genetic Psychology*, LXXXIV (1954), 109-123.

Although reasoning and problem-solving behavior appear at an early age, during the early period reasoning is confined to concrete and personal things from the child's immediate environment. As the child grows older, there is a significant increase in his ability to state a problem in words and to verbalize its solution. Also, older children are significantly better at recognizing the problem as a problem. Elementary-school children are capable of solving problems involving human relations, provided such problems appear as an important aspect of their immediate environment. At all stages in his growth, the child needs guidance in the development of better methods of solving problems.

QUESTIONS AND EXERCISES
for discussion and study

1 Look up several recent definitions of intelligence. What similarities do you note in the definitions? What differences?

2 How do normal children differ in mental growth and development? What are some factors that may account for such differences?

3 List four or five important generalizations based upon studies of the constancy of the IQ.

4 If you have the opportunity to study a child, evaluate his or her language ability in relation to his chronological age. Evaluate his language development in relation to his environment.

5 What is meant by comprehensible speech? Trace the growth of comprehensible speech.

6 How are reasoning and problem-solving related to language ability? What other factors affect the nature of the school-age child's ability to reason?

7 How can the teacher help the child acquire number concepts? What cautions should be considered?

8 Show how a child's lack of understanding of a particular situation may be a result of lack of experience with the situation.

9 Show how a child's concept of a word tends to grow as a result of a wide range of experiences with the word.

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CHAPTER 10

Emotional development

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Emotion and life at school

THE LEARNER'S EMOTIONS are involved in all his activities at school. If the school program is suited to him, he will derive joy from his achievements and look forward with pleasure to stimulating tasks that lie ahead. On the other hand, annoyances and irritations are bound to occur even in the best school, and some features of the school program are likely to arouse fear, especially if they threaten the learner with failure or threaten to expose weaknesses within him that he prefers to hide from himself and others.

Emotions are also constantly involved in the learner's and teacher's relations with people at school. Feelings toward others may range from spontaneous friendliness to deep dislike. There may be an undercurrent of anxiety and resentment in the learner's attitude toward pupils with whom he competes. Emotions ranging from love to hatred may characterize his attitude toward his teacher.

To do a good job, the teacher must be sensitive to emotions that arise in the classroom, including his own. He must be able to accept his pupils as people who, like himself, are creatures of feeling. Such acceptance does not mean that he must yield weakly to every show of annoyance or become a sounding board for every passing whim or mood of the class. It does mean, however, that he must try to appreciate what the feelings of others mean to them, and what is the nature of his own feelings. If a certain pupil feels abused and unfairly treated, for example, this is an important fact in *his* life whether or not, as far as the teacher can see, there is any objective reason for his feeling that way. Again, if a child is afraid to speak up in class because he cannot bear the thought of making a mistake that might cause him to look ridiculous, that, too, is a feeling with vital meaning to him even though the other members of the group might actually be quite sympathetic if he recited badly.

For a teacher to be alert to emotional currents in the class is important in connection with the teaching of any subject or skill. It is even more important in connection with the larger objectives of education: to help each learner, as much as possible, to realize his potentialities as a person; to help him to learn to face reality, accept himself, live comfortably with his own thoughts and feelings, and get along amicably with others. To achieve these larger goals it is essential that each learner be helped, through his experiences at school, to grow in the understanding of his own emotions and those of others.

Importance of the school in emotional development

In the lives of most young people, the school is probably second only to the home as a basic influence on the feelings a person will acquire with regard to himself and others. In some respects the school's influence is more important than that of the home, for life at school includes areas of experience that are outside the reach of the home. When a child goes to school he enters a world that is removed from the protection (or overprotection or rejection) that is accorded to him at home. He is put upon his own. He is placed in the hands of a strange adult—a new parental figure—at an age when he still needs adult support. He is thrown into dealings with his peers during a phase of his development when social relationships with his age group are becoming very important to him. The attitudes others show toward him and the judgment they place upon him will have an important bearing upon his growing conception of himself.

Emotional ramifications of academic achievement. In most schools, the main task that faces the learner is an intellectual one. But the learner's intellectual achievements influence and are influenced by his emotions. From an early age, a sense of achievement is a source of good feeling and self-esteem, and failure a source of anger and self-reproach. Although the experience of failure is frustrating, it is bound to occur in the life of everyone, and it is not, in itself, damaging if the task the learner undertakes is so important to him that he has a strong impulse to try again.

But under other circumstances (circumstances that often prevail at school) failure can become very destructive. Failure is bitter at any time of life when the learner not only feels frustrated but also feels blamed and rejected by others. And it becomes most damaging when the learner not only feels rejected by others but begins to feel that he does not have the ability or the right to succeed. When he feels this way, he is beginning to reject himself. When this occurs, he is not measuring himself solely against an objective standard of achievement but against a standard that he has adopted in judging himself. He is judging himself in terms of a *subjective* standard.

We have now touched upon two concepts that are of primary importance in understanding the emotions of those whom we teach (and also in understanding our own emotions). One is the concept of self-acceptance and self-rejection. We will touch again on this concept in a moment. The other is the concept that the standard by which a learner judges himself must be viewed not only from an objective but also from a subjective point of view.

Objective and subjective aspects of emotions. Sometimes the objective and the subjective standards seem to be much the same, but often they are not. Several students correctly answer eight out of ten problems. The grade of eighty may have many different subjective meanings. To one student, who has had trouble with arithmetic, a mark of eighty is a triumph. To another student who demands perfection of himself, the grade of eighty is a defeat. To a third student the grade doesn't mean much; it might be seventy or eighty or ninety, but it is all right as long as it is passing. Thus, the emotional meanings are quite different: one feels happy; another feels angry at himself (and perhaps at the teacher) and maybe he also feels guilty; another doesn't have much feeling one way or the other.

The fact that the emotional impact of any happening is determined not only by the happening itself but by conditions that prevail in the private life of the individual person is rather obvious, and yet this fact, more than any other, must be taken into account if we seek to understand emotion. The difficulty in doing this is twofold: it is not just the other person but it is also ourselves who are influenced by this subjective factor. One teacher likes a certain student, but another teacher dislikes him; one teacher admires a student who shows a lot of spirit, another teacher feels threatened by this student. One teacher who likes to have others feel dependent on him is gratified when students weepingly say goodbye on the last day of school; another is gratified when everyone says a jovial farewell. And so on. A teacher's feelings, like those of his students, are activated by something happening in the outside world, but they also spring from factors in the teacher's own inner life.

Concept of acceptance and rejection. The concept of acceptance and rejection, and notably the concept of self-acceptance and self-rejection, is essential for understanding emotional development and emotional health. By self-acceptance we mean attitudes of trust, confidence, and healthy self-regard that enable a learner to be free to draw upon his potentialities, to realize his possibilities, while yet remaining free to profit from correction and criticism. By self-rejection we mean attitudes toward self that hinder a person from realizing and enjoying his endowments, attitudes involving irrational tendencies to feel grievance, guilt, inferiority, or other aspects of self-reproach that prevent him from using his resources and facing his limitations.

Even if our aim in education were only to cultivate the intellect, emotions linked to the learner's attitudes toward himself must receive primary attention. The learner's intellectual possibilities are bound to his emotions. His mind is not free if his emotions are fettered. This proposition is plausible enough when we consider the students who do poor work at school because of emotional disturbances. In recent years there has been mounting evidence to show that many of those who have reading difficulties, and many "underachievers" who are not performing "up to capacity," have emotional difficulties. The interplay between emotional and intellectual factors is clear enough with these. But the role of the emotions can be seen also in those who are successful, and even brilliant, in meeting formal academic requirements.

Academic achievement and attitudes toward self. There are many studies that emphasize the fact that when we seek to take account of the relationships between the learner's emotions and his life at school it is essential to look at more than the objective facts concerning his academic achievements. In a study by the writer (42) [1] about two thousand students, ranging from the fourth grade through college, wrote compositions about the way they felt about themselves under the topics, "What I like about myself" and "What I dislike about myself." One impressive finding was that, when evaluating themselves, these people mentioned emotional characteristics and social relationships much more often than their academic achievements. When experiences at school were mentioned, they were named more often as a source of self-reproach than as a source of pride or self-confidence.

It is not difficult to see why students who do poorly in their academic work would regard their experiences at school as a source of self-disparagement. But it is not the poor achievers alone who feel self-reproach and a low self-regard. In another study by the writer and his associates (48) it was observed that a large proportion of students who make passing marks worried about the possibility that they might not be promoted (the nonpromotion ratio was less than two per cent; but about fifty per cent worried about not being promoted). When so many children have worries about school that from an objective point of view are unrealistic it seems reasonable to assume that from a subjective point of view something within themselves, abetted by influences that prevail in our educational system, has led them to underestimate their own worth.

At the adolescent level it was found, in another study (Smith, 90), that "inferiority feelings" were about as common among students with high ability as among students with low ability. In still another study at the high-school level (Spivak, 94) it was found that there was a zero correlation between academic achievement and self-acceptance ("self-acceptance" was measured by a 132-item self-rating scale).

Discrepancies between emotional and academic dimensions of life at school. In its most general terms, findings such as those noted above mean that for many learners the emotional and the academic dimensions of life are widely separated: this holds true, for example, when a student who is succeeding has an unrealistic fear of failure. It holds true also for a large number of students who are getting along reasonably well in their school work but are moving toward adult life with a burden of emotional problems that most schools almost completely ignore. Elsewhere the writer has reviewed studies that indicate that a large number of young people are moving through our schools into adult life with fears, grievances, and self-punishing attitudes.

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[1] Numbers in parentheses refer to entries in the bibliography at the end of the chapter.

It is not just the students when bor with unresolved emotional issues in their personal lives; a large proportion of teachers also struggle with emotional problems, as shown in a recent study by the writer conducted in cooperation with several hundred teachers (43). If our aim in education is simply to make sure that a reasonable proportion of students succeed in meeting subject-matter requirements, we can dismiss emotion as being of no concern. But if our aim in education is (as most educators would claim it should be) not only to help the learner to learn academic subjects but also to use his mind in dealing with concerns that arise in his own inner experience (his problems, his goals, his outlook on life), we need to give a great deal of attention to emotion. There are many research findings that indicate that at all educational levels a large proportion of students lead, so to speak, two lives and dwell in two worlds. There is the world encompassed by what is offered and demanded at school. There is also the world consisting of the student's fantasies, perplexities, strivings, and hopes. These worlds are often widely separated. There is the scholar we see before us in the flesh; but there is also the hidden scholar, laboring with his own concerns.

In a study of three hundred adolescent girls of high-school and college age, Frank *et al.* (23) portray the gulf that often exists between the academic program and the issues that adolescents face in their personal lives. A study by the writer and his associates of interests expressed by elementary and high-school students (55) touches upon the same issue. When young people expressed their interests in the usual school setting, most of them mentioned topics of the sort we ordinarily meet at school. In a supplementary study, when a number of elementary-school children were approached in a more personal way, all of them revealed that they were troubled by fears. Yet it did not occur to any child to mention his fears as something that the school might be concerned about. This finding is not surprising, yet it underscores the gap that exists between the kind of academic exercises students go through at school and some of the concerns that invade their private lives.

Conditions underlying emotion

Conditions that give rise to emotion are as varied and complex as life itself. To understand what may arouse emotion it is necessary to take account of needs, motives, desires, and goals that may be furthered or blocked by the circumstances of everyday life. Emotion may be aroused by an event in the outside world or within the individual himself which, on the one hand, threatens, or thwarts, or actually injures him through damage to his body, pride, or self-esteem. In that case *negative* emotions such as fear or anxiety, anger or hostility, or complex feelings of self-contempt occur. On the other hand, *positive* emotions may be aroused by any circumstance that furthers, augments, or enhances the gratification of a person's needs or the realization of his goals.

Some emotional experiences are common to all human beings. Other emotional experiences are more limited in range or scope. For example, they may occur only when a child has reached a particular level of maturity. The young infant is not afraid of something unfamiliar until he is mature enough to make distinctions: to recognize that the stranger now trying to pick him up is different from the people who usually pick him up. At the elementary and junior high-school period most children go through a phase of social development in which they are deeply concerned about their relationships with their peers; accordingly, they may be far more on guard against ridicule from their age-mates than they were some years earlier or will be some years later. An adolescent, concerned about his dealings with the opposite sex and still unsure of himself in that regard, may be much more subject to elation or dejection when someone of the opposite sex responds to him in a certain way than he would be earlier or later in life.

Some common needs and concerns

The most obvious human needs are those involved in the maintenance of physical survival and well-being.[2] Less obvious but just as important are the needs that occur by virtue of capacities that all human beings have in common, and tendencies that arise in the life of the individual because of the particular kind of person he is. Broadly speaking, the human organism has a tendency to *actualize* itself.[3]

According to this concept, a person strives from an early age, with varying degrees of endeavor, to become what he potentially might be. He has a need not simply to survive, but to use his powers: to perform, to produce, to experiment, to venture into the unknown and untried. More is involved in this than mere physical survival—the individual has a drive to expend energy, not simply to save it. Associated with the possession and development of a capacity or power is an impulse to use that capacity or power.

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[2] References in the bibliography at the end of this chapter bearing on one aspect or another of the concept of motivation developed here include 26, 68, 71, and 88.

[3] This term is taken from Goldstein, 30.

So the basic question of human motivation is not: What does a person *want* to do? Rather, it is: What is he *able* to do? Human abilities are equipped with a self-starter. Accordingly, human motives range from those involved in the physiological needs of the organism to those concerned with the needs for self-realization. Only by being arbitrary can we offer even a brief list of such needs.

We have mentioned the needs for physical survival and bodily comfort. Here are included the needs for food, air, and drink; for protection from extremes of temperature and from physical impairment or bodily harm. The need pertaining to sex is also in this category. This involves physical urges that become especially noticeable with the onset of puberty, although sexual development and motivation has a history extending back to early infancy. The physical needs pertaining to sex very often become complicated by a variety of psychological needs.[4] As a result, the drive underlying an apparent need for sex activity in late adolescence may range from a relatively elementary physical appetite in the form of erotic desire to a complex personality manifestation in which the sexual component is a minor or incidental part. Thus, a young person may use sexual activity not primarily for erotic purposes but to achieve something of far greater importance to him, such as the experience of being treated as a desirable, acceptable, lovable person.

Activity drives. Apart from drives such as those just named, what we might call activity drives lead to the use and exercise of capacities of various kinds.

A drive for *muscular* activity can especially be observed in young children. *Sensory* drives are directed toward the exercise of sense organs. A child feasts upon sights, sounds, cutaneous contacts, and other sensory experiences.

There is a drive toward use of the *intellect*. The normal child (or adult) is eager to find out, explore, discover. The psychologist Shand, writing many years ago, was so impressed by the gratification that comes through satisfying curiosity by intellectual activity that he listed *curiosity* as one of the "primary" emotions.[5] Another psychologist, McDougall, listed curiosity as one of the seven principal "instincts," and linked the emotion of *wonder* to this instinct.[6] We might add that the sudden gratification of an intellectual drive in a deeper and more profound form may lead to an overwhelming feeling of *awe*.

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[4] For discussions of the interplay between sexual and more pervasive emotional needs and personal tendencies, see 16, 39, 40, 47 (chap. 12), 78, and 102.

Another group of needs that are readily observed in operation but not easily defined in precise psychological terms is connected with the growing person's capacity for *social* response. These include what have been described as the need for love, affection, or belonging: and the need for approval, recognition, or acceptance. We might add those emerging needs that impel the growing child not only to *get* something from the group or from his fellows, but also to *give* something. We note here an overlapping of what might be called *social* and *emotional* needs: the need for loving as well as being loved; the need to share, to cooperate, to participate as a member of a group in projects involving something more than oneself.

Needs relating to selfhood. The needs mentioned immediately above overlap with another set associated with the growing person's concept of himself, his needs for *self-esteem, self-approval,* and *self-fulfillment.*[7] Needs in this category, as in others, may be healthy or, because of unfortunate experiences in a child's life, may have a false or morbid quality. Thus, a person, instead of spontaneously accepting and respecting himself for what he is, may be driven to sustain a false pride, be burdened by unhealthy feelings of guilt and self-contempt, or feel compelled to live a role out of keeping with what he is or can ever hope to become.

Need for self-study

The teacher who sees his job as involving a constant effort to learn must be alert to at least two things. First, he must keep his eye on anything the pupil does or says that reveals something about his feelings. He must look for obvious expressions of feeling; he must also try to see through the many disguises that children begin to use in their earliest years to hide feelings from others or from themselves. (More about that later.) Secondly, the teacher must be as alert as possible to the play of *his own feelings.* What a teacher sees in the behavior of a pupil and how this affects him will, of course, be influenced very greatly by his own feelings, by what *he* as a person has at stake. This is perhaps the hardest lesson of all to learn in dealing with the emotional behavior of others. It is difficult for an adult to realize that his own feelings may function decisively in practical, give-and-take relationships. An irritable or peevish adult may interpret something the child does as a sign of anger or rebellion, whereas another adult, in a more serene frame of mind, would not regard it as that at all.

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[5] See 85.

[6] See 65.

[7] References dealing with emotional implications of the self-concept and the self-image include 26, 38a, 39, 40, 42, 43, 61, 71, 74, 78, 82, 91, and 95.

It is especially difficult to take a rational view of the emotional behavior of another person—even that of a very young child—when one's own anxieties are aroused. If the teacher, although now an adult, has deep-seated conflicts within himself, they are likely to color his interpretation of what his pupils say and do. If, for example, he has inconsistent attitudes toward people in authority—if he is irrationally awed by the opinion of his superiors in the school or prominent persons in the community, yet also resents these people—he may exaggerate the meaning of a pupil's petty act that suggests an element of disrespect for authority. A teacher's own anxieties are also apt to color his interpretation of pupil behavior in the area of sex. Teachers are often disturbed to a degree that interferes with good teaching when anything pupils do by way of drawings, note-passing, or suggestive behavior touches upon anxieties pertaining to sex that they have not resolved in their own lives.

To indicate that a teacher's own uncertainties interfere with his understanding of others is not to find fault with the teacher. In our culture a large proportion of individuals, including future teachers, are likely to enter adult life without having fully resolved all questions pertaining to authority, sex behavior, or the like. The individual should not be blamed for this. But it emphasizes the point that we have been trying to make: To interpret the emotional significance of the behavior of his pupils, a teacher must continually seek to understand himself as much as possible.

Emotional behavior in infancy and early childhood

To understand the emotions of a child of school age it is essential to look at his emotional development during earlier years. Just what the emotional experiences of the newborn child are, no one can tell.

On the one hand, newly born infants sometimes behave as though they were violently aroused. An infant's cries, accompanied by bodily movements, seem to rack his entire being at times. If such vigorous behavior means a corresponding intensity of feeling, we must conclude that emotional experiences can be as overwhelming during this early period as at any later stage of growth.

On the other hand, a newborn child is relatively unresponsive to many circumstances that, later on, will arouse him.[8] In several experiments performed with babies soon after birth, or during the first few weeks of life, it has been noted, for example, that many infants seem to be relatively unaffected by stimuli calculated to arouse pain, fear, or anger—such as being pricked by a needle, having their movements restrained, or being dropped through space and then caught again. Moreover, studies by means of direct observation, motion pictures, and recordings of children's cries indicate that the infant's response to stimuli designed to arouse emotion are very diffuse and lacking in organization, like other aspects of the behavior of a child soon after birth.

Significance of early emotional experiences

The question of the extent to which the young child can experience intense emotion has important implications for the understanding of human behavior, especially in view of theories that emotional shocks and hurts suffered by individuals at an early age can handicap them as long as they live. Is it possible for a young baby to be wounded emotionally, almost or completely beyond repair? We cannot enter into a full discussion of that provocative question here, but we may mention certain points.

We know as a matter of ordinary observation that children sooner or later acquire the capacity for experiencing emotions such as anger, fear, and also sorrow or grief, to an intense degree. This capacity develops, it would seem, before the child is mature enough to be able to use language to formulate his experiences in words.[9] Further, it appears that children are capable of rich and varied emotional experiences before reaching the stage of development at which they are able to organize and formulate their experiences clearly in definite memories that they can later re-examine and review. In other words, a child goes through many emotional experiences that, in theory at least, may influence his attitude toward life before he has established the chain of recollections such as a person draws upon for an autobiography or for reflecting upon his past.

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[8] For studies dealing with emotional responses in infancy, see 5, 8, 13, 32, 33, 41, 60, 75, 86, 87, 92, and 93.

The child's attitudes are being educated almost from the time of birth—his attitudes toward older people and what these people do and mean to him; his emotional response to demands, commands, and rules imposed on him by society; his emotional response to aggressiveness or friendliness in other children; and his emotional reaction to tendencies within himself. At about the age of six, in the first grade, he has already gone through a tremendous amount of experience that may have influenced his emotional habits to a profound degree. Common sense tells us that much. But to what extent are some or all of these attitudes so firmly set that there is little we can do at school to reach him or change his emotional tendencies basically?

We cannot fully pursue that question here, but it is one that students of educational psychology must face. Persons in the field of psychology and psychiatry differ in the degree to which they offer a pessimistic or hopeful answer. At one extreme is the position that the emotional conditioning that takes place during the child's early years is fateful and almost irrevocable. According to this view, a child's basic attitudes, including either wholesome self regard and a friendly disposition toward others or a tendency to be anxious or weighed down by inferiority feelings or other forms of self-disparagement, are so strongly entrenched by the time a child reaches school age that only with time-consuming help from a highly trained specialist, such as a psychiatrist or clinical psychologist, would the person be able, if at all, to modify or reconstruct important features of his approach to life. At the other extreme is the view (not usually stated in so many words, perhaps) that almost anything we do at school to promote good work habits, cooperation with others, citizenship, "acting on thinking," use of the problem-solving approach, and so on, may contribute something substantial to the child's way of life.

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[9] See, for example, 5 and 8.

Probably the truth lies between the two extremes. Certainly we cannot blandly assume that almost anything taught at school in the name of good education will really make much difference. It seems safer to assume that a great deal of what we do there may be a form of side-stepping, an evasion of the real problems of life. As noted on an earlier page, the "interests" pupils express, and which teachers sometimes eagerly seize upon, often fail completely to touch upon deep-seated problems in pupils' lives. But that we can do little or nothing at school to reach and redirect a child's deep-seated emotional tendencies is, in the writer's opinion, overly pessimistic.

True, much that influences a child's emotional life occurs before he comes to school; but we can also recognize that what has been learned then is not necessarily set off in an inaccessible capsule. When past events influence a person's emotional reaction to the present there is, to a degree, an overlapping of the past upon the present. The past and present are brought together in a new context. When the past is thus revived or relived there is a possibility that its effects may also be revised.

When a child comes to school he may have had experiences that dispose him to be trusting and friendly upon his arrival there. If such a child falls into the hands of unsympathetic teachers we cannot be sure that his earlier attitudes will preserve him from feelings of hostility and self-distrust. Let us assume, on the other hand, that he comes with attitudes of hostility and distrust based on hardships earlier in his life. Let us say that he was rejected, treated harshly, or abused to such a degree that he has come to look upon people with fear, as persons who would harm him if he were not on guard. At the age of six, entering school, he may be unwittingly defensive and guarded in his attitude toward others, suspicious of even those most friendly toward him. Without realizing it himself, he may have a chip on his shoulder and reveal an undercurrent of hostility toward others even when he has a smile on his face and makes a disarming show of meekness and compliance. Surely it would be more difficult to re-educate such a person's attitudes than to help a child to overcome an isolated fear of a dog. But we need not assume that even these attitudes are completely impervious to any influence.

To the extent that the effects of past experiences project themselves into new contexts, a continued possibility that these effects can be modified undoubtedly exists, at least to a degree.

Changes with age in expression

The expression of emotion continues to change, in one way or another, throughout childhood and the adolescent years. As noted above, anger becomes roughly distinguishable from other forms of distressful excitement during the early months of life. For a time after this, however, the infant's expression of rage is still poorly aimed and poorly organized as far as retaliation against the offending object is concerned (31). The infant thrashes out at the world in general, so to speak. Later, his anger becomes more definitely directed at something or somebody. Changes can likewise be noted in a child's expression of fear and in his reactions to pain. These improvements in the youngster's ability to respond in specific ways to situations that arouse him parallel the development of his mental and motor abilities.

Moderation of overt manifestations. With the further passage of time, the child also becomes able to express his emotions in subtler ways. Moving from infancy through the preschool period the youngster does less hitting, fighting, and tearing with anger, on the average, and resorts increasingly to the use of language and other substitutes for direct attack.[10] These substitutions may eventually take almost endless forms, ranging from mannerisms designed to irritate, belittle, or humiliate an adversary, to such extreme kinds of refractoriness as stealing, truancy, vandalism, and the like.

Similarly, the young child, when frightened, unhesitatingly cries and gives vent to his distress by actions such as clutching or fleeing. When he becomes able to talk, he will often speak about his fears. As time passes, such expressions decline. From the early preschool level on, the frequency of episodes in which the child shows fright in a manner that others can readily see usually falls off. There is not, however, a similar decline in the frequency with which the same youngster *feels* afraid.[11]

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[10] See 27, 31, 72, and 81.

The ability to suffer in silence, to contain one's wrath and inhibit the more obvious symptoms of fear, is one of the phenomena we normally associate with increased emotional "maturity." The gradation of response can be noted mainly in connection with the emotions involved in distress, but it occurs also in connection with other emotions. The older child is less likely, for example, to squeal and dance with delight—although the signs of delight, except for the more raucous outbursts, do not usually wane to the same degree as those of anger or fear. An associated developmental phenomenon is the ability to moderate the expression of desires and appetites, and to tolerate delays in the fulfillment of desires.

Factors contributing to a decline in overt response. Several factors contribute to this change in the outward manifestation of emotions that involve distress. As the child's intellectual and motor capacities mature, he acquires a larger variety of means of expressing his feelings. The decline in direct, overt expression is also associated with changes in his susceptibility. As a child acquires increasing ability to formulate plans, anticipate the future, and understand the meaning of what is happening in his everyday environment, he also becomes susceptible to thwartings and threats that do not involve immediate physical interference or danger, and do not so readily induce direct action in response to a concrete object or person.

In addition, factors in the child's everyday environment contribute to a decline in explosive emotional outbursts. He is admonished by his elders to "pipe down." Through the example set by adults and other children, and frequently through their taunts, he is under pressure not to be a "cry-baby" or "fraidy cat." Also, he has occasion to discover that violent outbursts sometimes do not solve a problem, but actually make it worse.

Frequently a youngster will be more strongly influenced by these pressures outside the home than within the family circle, with the result that, in their own homes, many children will show emotional outbursts in response to provocations that they will face with outward calm when at school. Even in the home environment, however, the older child may be subject to many fears and resentments that are not obviously expressed and which his parents do not comprehend.

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[11] See 50 and 53.

Some effects of concealment. As noted above, the child as he grows older tends to shift from "wholehearted," overt, and direct to more graded, covert, and indirect forms of expression. The farther this process goes, of course, the more difficult it becomes for others to perceive his emotions. This problem is further complicated by the fact that children have feelings that they themselves cannot understand, and because children as well as adults frequently hide their feelings in order to protect their self-esteem.

In many ways such concealment may benefit society at large. Certainly it would be uncomfortable if everyone went about "wearing his emotions on his sleeve." But such concealment often leads to misunderstanding and hardship. In school, in camp, or even in the home, a child may struggle to be a Spartan in the face of troubles that might be relieved if he only felt free to confide in others. He may nourish many resentments that could be resolved if only he would discuss them. He may harbor many desires, temptations, and feelings of guilt that would be easier to bear if he knew that all human beings are afflicted by such conflicts.

This habit of concealing emotion may become especially burdensome under two conditions. First, the person is simply adding to his troubles if emotions that he is unable or afraid to express in the first instance actually crop out at inopportune times. For example, a person may mask an intense feeling of anger that occurs when someone hurts his pride very sharply and then, still harboring this anger, may explode on another occasion because of a very trivial affront.

Second, a habit of concealment has serious consequences if a person not only masks his emotions but also becomes anxious about the possibility that someone may chance to look beneath the mask. The burden of fear becomes heavier if a person is not only frightened by things that ordinarily scare people but also by the thought that someone may regard him as frightened and cowardly. Rage becomes more corrosive if a person not only harbors anger in response to things that would excite the wrath of any healthy person but is also anxious that someone, discovering that he is not a serene and benevolent person, will perceive his hostility in its naked form. Again, suppression of any show of emotion may be harmful if an individual, for one reason or another, has put a lid on any impulse to show affection, and is awkward, and even rude, when he happens to feel very affectionate toward someone and wishes that he could somehow show it in a spontaneous way.

Developmental changes in emotional susceptibility

A person's emotional susceptibilities *widen* in keeping with the changes in all other aspects of his development. As he grows in understanding, as the range of his abilities and activities increases, he becomes involved in more and more activities which, if threatened, thwarted, or furthered, involve him emotionally (45). Many of the experiences involved in the growing person's widened range of emotional susceptibility are linked to life at school.

Further, as he gains in the ability to formulate and remember his past and, through his imagination, to anticipate or project himself into the future, the circumstances in which his emotions come into play are vastly enlarged. He may look upon his past with guilt and self-reproach. He may regard the future with fear or joyful expectation.

On the other hand, as he gains in power and improves in his understanding of the world about him, many events that once aroused his emotions cease to do so: A threat that troubled him when he was smaller and weaker may leave him untroubled now that he is bigger and stronger. An obstacle that once angered him may later be a pleasant challenge and, still later, a boring interruption.

Affection

Probably the most important factors in a child's emotional development are the affection that he receives *from* and his opportunity to develop wholesome affection *for* his fellow creatures.[12] He comes into the world helpless, utterly dependent upon others. In some ways his helplessness is his strength, for it impels others to protect and care for him. The impulse to care for a child comes powerfully into play in normal parents with the birth of a baby. The mother is moved to minister to the infant and relish his ways even though the care of the child involves many inconveniences. The new father is also likely to experience feelings and sentiments that he could not have fully anticipated.

An attitude of affection—the love that a parent feels for a child—

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[12] For a discussion of certain aspects of affection, rejection, and overprotection, and other studies of the effects of parental attitudes, see various articles in the *Smith College Studies in Social Work* and 1, 3, 22, 29, 49, 62, 75, 79, 92, 96, 97, and 102.

and similarly the love of a teacher or any other adult for his pupils or the children with whom he deals—is likely in one way or another to leave its mark on everything that goes into the day-to-day business of living. Caresses and verbal endearments constitute only a small feature of the total expression of love (although a very nice part). Genuine affection for a child or adolescent means that he is accepted. That acceptance will reveal itself in countless ways. He is wanted for his own sake. He is enjoyed for what he is. There is something wholehearted, not calculated, in the adult's approach. The child can be short or tall, or quick or slow in his movements; he can get his first tooth, or say his first word, sooner or later than the baby next door, but he still is a wonderful little person. The accepting adult does not surrender his right to set limits or his responsibility for being as thoughtful as he can in exercising discipline. But in doing so he respects the child's individuality. He is not loved just because he is especially good or obedient, tidy, pretty, or successful at school, but because of what he is in his own right.

The child who is accepted will have freedom to try things out, to explore, to make mistakes and, in the process, to learn. This means that he will be free to experiment even with mischief and disobedience without feeling that he thereby threatens the relationship between himself and significant adults. When allowed to swing along at his own pace, to learn at his own rate, he will have latitude in which to venture and explore. He will not be walking a tight rope, fearful that one little slip will result in repudiation and rejection.

The more genuine the parent's love for the child, the more the child tends to feel free to love other people. Moreover, he is likely more freely to express all his emotions. Where there is a state of mutual acceptance, there is much more room for spontaneity.

Affection in pupil-teacher relations. All psychologically healthy adults are inclined to feel some affection for children in their charge, or with whom they have a chance to associate, even though the children are not their own. The relations between sympathetic teachers and pupils share many elements with the parent-child relationship. A child seeks a degree of "warmth" or fondness in his relations with his teacher.

Even the child who seems aloof or definitely rebellious is apt to have a strong desire to be liked. One evidence, among others, of children's desires in this respect appears in the reports they give when they describe the teachers they like best. A large proportion of children, especially the younger ones, do not make specific mention of the teacher's ability to teach, but instead emphasize items such as "She likes her pupils," "She is kind," or "She wasn't just trying to teach us to read."[13]

The most effective teachers, while guiding the learning of their pupils, also succeed in identifying themselves with the human concerns of their pupils. Teachers may succeed in their emotional relations with their pupils even though they differ widely in the degree to which they make an obvious display of their feelings. However, it works a hardship upon pupils if teachers, too eager to win affection and avoid the possibility of hurting the feelings of their pupils, become so lax and indulgent in their techniques that children grow confused and lack confidence in the teacher's leadership. Children like to be guided by a person who is loving, but also firm.

The teacher should not feel free, however, to displace or usurp the emotional role of parents, except, perhaps, under very unusual circumstances. The teacher will also recognize the possibility that, in some instances, parents are jealous of the teacher's position, especially if they have had difficulty in winning their child's wholehearted regard. The teacher will also recognize that jealousy may exist in a classroom just as at home. One of the bitterest complaints that a pupil can make is that his teacher has favorites or "pets." A teacher cannot help being drawn more strongly to some pupils than to others, but it is still important to try to avoid obvious favoritism and to be sensitive to the hurt feelings of pupils who believe themselves rejected.

Affection and "security." In the foregoing paragraphs we have stressed the point that affection is important for an individual's emotional welfare. In some measure, each individual needs to feel that he is wanted and liked, that he belongs and has value to others. Confidence in the fact that others are concerned for him is an important factor in promoting a child's "security."

Emotional security, however, does not mean simply that either the adult or the growing child can sit back and passively count upon the affection of others. He must be ready to do for others what he desires to have them do for him. If a person is disproportionately on the receiving end, his "security" is built upon dependence; the more dependent he is, and the more he proceeds on the attitude that others owe him much, the more insecure is his position. On the other hand, the more he can reciprocate the affection that he desires from others, the more secure is he likely to be.

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[13] See 49.

Development of children's affection for others. Although children begin at the receiving end, all normal youngsters have potentialities for acquiring affection for others. The younger the child, the more his affections are restricted to the home circle. A normal child's affections extend to his brothers and sisters. But affection is never the only emotion exhibited in the relations of brothers and sisters; jealousy and varying degrees of hostility are also common. As the normal child grows older, his affections extend increasingly beyond the family circle. Experience with affectionate behavior at home helps to develop an individual's capacity for feeling and spontaneously expressing affection for persons outside the home.

Signs of lack of affection. Signs of absence of affection toward a child are as numerous as signs of acceptance, although the adult will try more often to conceal them. The most important feature in a nonloving or nonaccepting attitude toward a child is that the child is not accepted for his own sake, but is either openly rejected or accepted only if he meets certain terms or conditions laid down by the adult. In other words, if not rejected he is "loved" only at a price. He may be a prop to his parent's pride, or the instrument by which his teacher exercises his need for power. He may be the sign of achievement by which the parent or teacher vindicates himself and relieves some of his own feelings of inferiority and inadequacy. He may be a means by which the parent or teacher carries on a highly competitive battle with life.

Obvious signs of lack of affection arise in connection with the way in which the parent or teacher deals with immaturities in the child. It annoys him that the child should cry. It arouses his anger if the youngster is slow to understand. His anger flares if the child is slow to respond or, if, when seeking a certain amount of independence and self-assertion, he becomes somewhat stubborn and disobedient.

Rejection of a child may also occur in connection with rather cruel ways of taking advantage of the child's weaknesses. Parents or teachers may play on the child's fears. And, of course, both parents and teachers may use obvious ways of expressing dislike, such as inflicting severe and cruel punishment, ridiculing, showing obvious favoritism toward someone else, speaking ill of the child in a humiliating manner in his presence and the presence of others. One finding in a study of the use of humor in the classroom situation was that teachers used humor more often in a sarcastic than in a friendly way (7).

Some reactions to lack of affection. The child who is not loved and accepted is left to find his own way without advantages such as those noted above in our account of the accepted child. He is thrown upon his own resources. He must defend himself even in early infancy, with little understanding as yet of what is happening, for he is not accepted as worthy in his own right. As he grows older the restrictions and restraints, the do's, should's, and don'ts imposed upon all children to a greater or lesser extent are likely to seem particularly arbitrary and exasperating to him. From a rather early age, accordingly, he is on the defensive. He must protect himself. He must be on guard against injustice. The less he learns to expect kindness as a matter of course, the more suspicious he will be of actual kindness.

The unloved person may suffer in connection with the development of his attitudes and concepts concerning his own worth. Sooner or later he may feel the need to prove his worth to others, to "show them." As he grows older he may develop an attitude of judging his worth largely by a competitive standard. He must be superior. He must surpass the other fellow. He must win and conquer. Conquest and superiority over others may be needed to compensate for the low estimate that he subjectively puts on himself. He may be driven to resort to all kinds of devices to bolster his self-esteem. As an adolescent he may even use the arts of love-making, not to express affection, but to prove his strength by making others "fall" for him. As an adult, he may be driven by a frantic quest for possessions, power, and prestige. Such a drive may not arise solely or exclusively from a lack of affection in earlier years but, generally speaking, the less inner assurance a person has concerning his own worth, the greater will be his need for external props to support his pride.

Response to a lack of affection may take either a rather aggressive form, as in the illustration above, or a very compliant, self-effacing turn. The child may strive to be extremely good as a means of purchasing the favor of his parent or teacher, or at least to avert open expressions of rejection. His "goodness" may be of a very unhealthy sort, based upon a pervasive fear of giving offense. As he grows older such a child may go to great lengths in his efforts to be all things to all men.

If a child feels impelled to give a great deal of his energy at an early age to protecting or vindicating himself, it will be hard for him to give free play to his abilities, trust his own impulses, or throw himself spontaneously into the experiences of life.

Reactions to rejection in school take many forms, such as sullenness, unwillingness to learn, restlessness, destruction of property, tardiness, absenteeism, and the like. It is not surprising that some such reactions occur, for in many schools the program is so structured that large numbers of students have the experience of being rejected. Students are rejected on a colossal scale by schools with course requirements and grading systems so arranged that large numbers of students are bound to fail, or are bound to feel that they don't count for much.[14]

When we observe that much of what a teacher does may be construed by a pupil as a form of rejection, we do not imply that the teacher must be a perfect creature who never even by inadvertence hurts anybody's feelings. A pupil's feelings are probably bound to be hurt now and then at school, no matter how good his teacher is. Certainly the child will be reminded of his lacks and limitations, at least, and that may be very painful even if no hurt is intended.

Still, if all schools and all teachers examined their policies, actions, and relationships with pupils from the point of view of eliminating as many needless and avoidable forms of rejection as possible, it would probably make a vast difference in the whole educational program from nursery school through college and postgraduate study. Even many seminars for doctoral candidates, at the highest academic level, might be more constructive if members of the faculty were less punitive and rejecting in their attitudes toward students and one another.

Fear

A person who is afraid shrinks or retreats from the circumstances with which he is unable to cope or which he regards as potentially dangerous. Under the heading of "fear" falls a wide variety of responses, from paralyzing terror at one extreme to mild forms of apprehension and withdrawal at the other.[15]

Fear may occur in response to a concrete situation, as when a child flees at the approach of a strange dog, or to circumstances that are not so direct or obvious, as is the case with most worries, forebodings, and anxieties. Moreover, these states of apprehension vary considerably as far as the individual's own understanding of them is concerned: a person may fear punishment for a definite act that he has committed, or he may be anxious about things in his life that he cannot identify but which make him feel apprehensive and depressed.

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[14] For an account of some of the emotional consequences of school failure, see 83.

[15] For studies dealing with fear and anxiety, see 11, 15, 17, 18, 25, 34, 35, 37, 38, 41, 43, 48, 50, 53, 67, 84, and 100.

Utility of fear. The fears that beset a person in everyday life frequently serve as a safeguard against harm and disaster. When a person is confronted by danger from which it is possible to flee, the energies that are mobilized sometimes lend speed and endurance to his flight. This mobilization of energies would, however, be more valuable if it were not for the fact that many circumstances that arouse fear in modern life cannot be disposed of by simply taking to one's heels. A frightened person may also be brought up sharply against dangers with which he hitherto has temporized. The fright produced by a near-accident in traffic, symptoms of threatened illness, or the possibility of losing a job, may jolt a person into changing his habits and mending his ways. Even an imaginary fear, arising in the absence of concrete danger, may have a constructive effect. A professor's dream that he is late for class and all the students have left, or that he comes to class inadequately prepared and the students leave in a huff, one by one, may indirectly prod him into being more punctual and diligent.

However, in many situations fear is absent when danger is actually present, and often, on the other hand, the incidence and intensity of fear may be quite out of proportion to the likelihood of danger. By the time an individual reaches school age, and thereafter throughout life, he is apt to fear many improbable dangers and to be apprehensive concerning disasters that never occur. In a study referred to earlier in this chapter, it was noted that about fifty per cent of the pupils in a certain group of classes reported that they sometimes or often worried about not being promoted at the end of the school year although statistics showed that it was likely that less than two per cent of them would fail to be promoted. In another study, almost fourteen per cent of the children, in describing their fears, mentioned animals or danger of attack by animals, but only about two per cent cited as the "worst happening" that actually had befallen them an instance in which they had been attacked or were in definite danger of being attacked by animals. If adults were similarly questioned, apprehensions concerning such matters as the likelihood of failure, loss of employment, destitution in old age, disaster to spouse or offspring, and the consequences of past misdeeds would undoubtedly be found to occur with a frequency and intensity quite out of proportion to what actually is likely to happen.

Fears at various age levels. In early infancy signs of fear arise mainly in response to sudden or intense stimuli of any sort, such as loud noises, sudden displacement, sudden contact, flashes of light, sudden movements, and the like. In general, as the child moves from infancy through the preschool years, the frequency of his fears with respect to concrete events in his immediate environment declines while that of fears expressed in terms of imaginary dangers, and dangers that may occur even though there is no immediate threat, increases.

The dark. During this period many children acquire fears pertaining to the dark and to happenings associated with darkness. Darkness and matters connected with the dark provide a fertile source for both realistic and unrealistic fears. On the one hand, a person actually is at a disadvantage in the dark: he may stumble, fall, or bump into things, and if something dangerous were really afoot it would be unseen and hard to cope with.

Moreover, fear of the dark is often linked with fear of being alone. On the other hand, darkness seems to provide a good screen, as it were, on which to project fears that already prevail. It is easy for a child who is already somewhat frightened to hear something sinister in noises occurring in the dark and to give rein to his imagination.

Being left alone or abandoned. Another fear that quite commonly occurs during preschool years is that of being left alone or abandoned. The fear of being left alone rests, of course, on the child's weakness and defenselessness, but it does not seem to develop or reach its full intensity until the child is mature enough to be able to understand to some degree the implications of being abandoned by or separated from his parent. Some children make the first obvious show of this fear when they lose sight of the mother on a walk or when the mother leaves them momentarily in the carriage while shopping. Fear of being left alone may sharply aggravate the emotional shock of being hospitalized or of being thrown among complete strangers at school.

Fear of animals. Between the time of infancy and approximately the first grade, a large proportion of children show fear of animals. As time passes many children continue to report fear of animals, but youngsters passing through the preschool into the elementary-school years tend to place less stress upon animals in their immediate environment, such as dogs, bulls, toads, insects, and the like, and mention relatively more remote animals, such as gorillas and wolves.[16]

Other fears. Beginning late in the preschool years and continuing into the elementary years and beyond, many children likewise report fears in terms of ghosts, bogies, corpses, or other superstitious or macabre subjects.

Beginning in the preschool period, but appearing more prominently at the elementary level, fears with respect to possible failure and humiliation are also reported by many children. These seem to be associated with the development of understanding of the idea of competition and standards set by others, and the growth of capacity for self-criticism.

By the time children reach elementary-school age, a large proportion of their fears, accordingly, are formulated in terms of imaginary or remote dangers. However, they still are subject to many fears specifically related to events in their everyday lives. When children report their "worries," for example, a large proportion of them will state that they worry about failing in examinations, being late for school, failing to win promotion, being scolded by parents or teachers, and so forth.

As the child matures mentally and the scope of his abilities and activities widens, other fears occur. Bodily changes associated with puberty may precipitate apprehensions of a sort that do not disturb a younger child. In the adolescent years and beyond, as the individual's situation and responsibilities change, apprehensions relative to personal adequacy with regard to sex, marriage, getting and holding a job, and hurting other people's feelings come into play.[17]

Causal and contributory factors in fear. Many factors contribute to a child's susceptibility to fear. Anything that weakens a child or lowers his self-confidence may make him more subject to fear. His tendency to be afraid may be increased by a weakened condition due to illness and fatigue. It may be affected by demands that overtax his abilities, conditions that threaten his security, reminders of failures, difficulties encountered in competition outside the home, circumstances that threaten him with loss of affection in the home and loss of acceptance by persons outside, or circumstances that belittle him, humiliate him, or make him feel guilty, worthless, or reprehensible. In like manner, anything that removes the props on which he leans for support or that threatens to take away protection on which he depends may enhance his tendency to be afraid. For example, while still at an age when he depends upon his parents, he may be troubled by any sign of weakness or fear in them. A rather high resemblance has been found between the fears of children and those of parents.[18] When a parent shows fright in a child's presence it probably not only means to the child that there is really something to be afraid of, but also that he cannot fully count on his parents to protect him because they, too, are weak and frightened.

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[16] See 50.

[17] Studies that discuss some of the worries of young people include 4, 28, 64, 67, and 73.

Varied expressions of fear. In dealing with frightened people it is important to bear in mind that fears may be expressed in many ways. Very often a child or an adult may be very fearful or anxious without revealing any sign of fear, such as trembling, cringing, or trying to run away. Fears have many faces. The child who seems happy to be on the sidelines may be a frightened child. He may be afraid of getting hurt or of not making as good a showing as his pride demands. The hostile, rebellious child may be a frightened child. By reason of abuse he may have become suspicious and defensive. A person may make a show of anger to conceal his fright, just as a terrorized dog will snap and snarl. Extremely "good," compliant, or conforming behavior may be a cover for fear.

Methods of dealing with fear of external dangers. In the normal course of events, many fears are "outgrown." However, many fears are not disposed of in this manner, with the result that, in a large proportion of individuals, fear persists over an extended period of time. A large number of adults continue to entertain fears that troubled them when they were very young.[19]

Dealing with fear is in part a problem of preventing fear. It would not be possible, or perhaps even wise, to institute a thoroughgoing program of protecting children from the experience of fear. At best, one could not be forewarned or forearmed against all events that might cause fright. But certain practical steps may be taken.

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[18] See Hagman, 34.

[19] See 50.

Many fears arise by reason of the suddenness with which a person is confronted with a circumstance with which he cannot cope. He may be severely frightened and suffer prolonged aftereffects if precipitated into a situation that could be handled with less emotion if he were introduced to it gradually. A policy of a gradual approach may be used in numerous practical ways to ease a child into new situations, whether it be his first contact with a barber or dentist, his first experience in performing a new task at school, or his first date or dance.

To overcome fears that are already established, various additional techniques are possible.[20] One frequently used technique is to try to relieve fear by verbal reassurance and by explaining that there is nothing to be afraid of. This method sometimes helps; often it has little value. A related technique is to try to help the individual to examine his fears and to obtain a better understanding of their origin and meaning. Needless to say, anything adding to a person's understanding of his own fears is likely to help him cope with them. But intellectual insight of this sort does not necessarily change the emotional conflict.

As already suggested, a most effective means of helping another to overcome his fears of circumstances in the external environment is to help him to become competent and skillful at dealing directly with the feared situation. Sometimes, as noted in one study, a deliberate effort to help a child to learn specific skills, such as climbing, skating, or other outdoor and indoor forms of play, will not only help reduce his specific fears, but will also, as a by-product, help to overcome his timidity in meeting and dealing with other people. Sometimes the child himself will acquire competence and confidence if the feared event is made accessible to him in his daily environment, where he can inspect, ignore, approach, or avoid it, as he sees fit.

In promoting a child's competence, a graded approach will often help him to grow accustomed to a feared stimulus by degrees or stages. School frequently offers such opportunities: if the child is afraid of reciting, let him first respond in unison with others, or be called upon to speak only when the teacher is certain that he has a ready answer. These are only a few of numberless methods to help a person to gain competence and come to grips with a feared situation.

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[20] See 38, 51, and 56.

Irrational fears

Fears of an "irrational" character can be seen most clearly when there is a complete discrepancy between the fear and its objective basis. A person who discovers, while picking up a board, that he has almost put his hand on a big spider has some basis for being frightened. Another person, afraid to go into the woods for fear of meeting a spider, has a less rational basis. Apprehension that occurs if one walks over a stream on a fragile plank that trembles and creaks underfoot is rational. A fear of going across water on a solid and well-constructed bridge is not. Fear of failure is rational if one has not studied one's lesson and is unprepared for a test. Less rational is a person's chronic fear that he will fail no matter how well he has prepared or how often he has been shown in the past that he can make the grade.

Anxiety

To understand the apprehensions to which children and adults are subject it is useful to distinguish *fear* from *anxiety*. According to one dictionary definition, *anxiety* is a painful uneasiness of mind concerning impending or anticipated ill. The uneasiness denoted by anxiety differs from the uneasiness involving fear, as these terms are commonly used, in this respect: The apprehension of danger or disaster in *anxiety* arises from something within the person himself, from his own conflicting drives and impulses, and unresolved problems. Thus, *anxiety* is a response to a hidden and subjective danger; *fear*, to an obvious and objective danger. Also, according to this concept, the subjective factor that leads to anxiety may be unconscious or unrecognized.

A rather familiar form of anxiety appears in *phobias*. A fairly well-known phobia is an irrational fear of being in a high place. The person suffering is frightened even though there is no real danger that he will fall or that the building will collapse. Something in him, rather than in the external situation, causes him to be afraid. In other words, an internal danger of some sort has been transformed into fear of a presumably external danger.

Many rather common "fears" of children and adults are phobias in the sense that they involve a projection, onto an external object or situation, of some kind of internal disturbance. According to this view, fears of ghosts and corpses (that in actual fact seldom if ever endanger anybody), of kidnappers and "bad guys," of being attacked by a lion or wolf, and, in many cases, of the possibility of accidents, represent situations in which some kind of apprehension springing from internal causes is fixed upon or symbolized by an external event.

There is not space here to explore all the ramifications of this concept of anxiety, but it is important for the understanding of the conduct of children and adults.[21] In many circumstances it is difficult to determine whether a person is afraid of a real danger (or what he perceives as a real danger) in the external environment or is distressed because something in the external environment touches off a disturbance within himself. But it is important to recognize that the fear *may* arise from an internal disturbance. If the fear is of this sort we cannot help the sufferer simply by treating its external aspects, or by explaining or demonstrating that there is nothing to be afraid of.

To face anxiety, a person must learn to cope with his own internal condition. He needs to be helped to understand himself and achieve a degree of self-acceptance that enables him to be free, as far as it is humanly possible, from irrational feelings of "guilt" and other forms of self-disparagement, from a need to live up to false standards, from a tendency to blame and punish himself for faults and shortcomings that grow out of distorted and unrealistic attitudes concerning what he ought to expect of himself.

That the internal or subjective dangers making a person anxious may be quite unrecognized or unconscious has been emphasized in discussions of anxiety. One theory, for example, maintains that a person's anxiety may be aroused by his own hostile impulses. The child may feel a surge of rage toward his parent and then recoil from it, frightened by it without really realizing why. Likewise, an adult may be vaguely troubled and apprehensive because of feelings of rage towards a spouse, friend, employer, or colleague without quite being able to put his finger on the fact that he actually has such feelings. Carrying this idea further: the unrecognized hostility may have grown out of an accumulation of past experiences involving thwarting, abuse, failure in competition, or feelings of being helpless in the face of injustice.

The idea that a person may be anxious because of unrecognized hostility will become a little clearer if we try to reconstruct experiences that might have befallen us as children. We know that even fairly young children become angry and at times enraged when they are blocked, scolded, punished, thwarted, or humiliated. But most children are also impressed very early with the idea that there is something bad about being intensely angry at another person. Moreover, the persons who live closely with the child and most often have occasion to thwart him are usually the persons who most often are kind to him, help him, and love him. They are the persons, also, whom he is most likely to love. When something happens that arouses his rage he not only is on the way toward having feelings and impulses that are generally tabooed but, even worse, he has an angry impulse to hurt someone he loves, although at the moment his feelings of affection may be weaker than his feeling of spite. So, the child is in quite a predicament. He feels a powerful impulse to cry out with rage, to strike and hurt the person who has angered him. But he also has impulses that go counter to this rather "natural" response. These impulses are intensified, perhaps, by the fact that the child is helpless and dependent. He needs the friendship and love of other persons even though they do arouse his rage. He cannot really afford to let himself be angry. As the child grows older this conflict may be complicated by feelings of self-reproach. The conflict may also be aggravated by a fear of reprisal if he should express his anger too violently. Thus, the surge of anger within him may have a frightening effect because to give vent to it would really prove dangerous.

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[21] Students who wish to investigate more deeply into the subject of anxiety are referred to 25, 38, 43, 70, 95, and 98.

If this line of reasoning is correct, it can be seen a little more clearly that a child (as well as an older person) may become distressed not only when his anger has reached full-fledged proportions and he has actually taken a swing at someone, but even before his hostility reaches this point. If you were suddenly to catch him in a moment of anxiety he might not be able to tell you why he was anxious, partly because the drama of his anger and recoil from the danger involved in that anger had not been fully acted out.

We have used the example of a child responding to the danger of his own angry impulses. But presumably what happens to a child may happen to an older person. The hostile impulses of an elementary-school pupil, an adolescent, or a teacher may certainly be as dangerous for various reasons as the hostile impulses of a helpless preschool child. In the case of an older person many additional complicating factors enter the picture—he is, if anything, more sensitive to the "badness" of being thoroughly angry at someone else. Moreover, over the years he builds a set of ideas concerning himself in matters pertaining to anger and rage. He may have convinced himself that he has a great deal of " self control," or built a conception of himself as a rather tolerant, patient, sympathetic kind of person who feels a flare of temper now and then, of course, but who is incapable of a downright impulse to tear other people apart, a desire to see them suffer, or a wish to see them swept off the face of the earth. When such a person feels an upsurge of rage it completely belies this self-picture. It threatens to tear the mask off his genial countenance and reveal the naked violence latent within him. Like the child, he may well feel himself greatly endangered or, in other words, feel anxious because of his hostility.

If our exposition so far is true, it is likely that a person will be less anxious by virtue of his hostility if he has a good insight into the fact that he is subject to hostile impulses (as all creatures are) and if he can accept himself candidly in this respect. In other words, he would have less reason to be anxious about his hostile impulses if he were able to accept himself as a person who sometimes feels hostile and if he were not under great pressure from within to put a false face on natural tendencies.

Another theory represents a somewhat broadened version of the concept described immediately above: a person may become anxious if he is threatened with exposure of *any* sort, whether of hostile impulses that he is eager to conceal from himself as well as from others, or of any other weakness or pretense.[22] He may be anxious about the possibility that someone will call his bluff. He may be anxious if someone sees through his pretended indifference to what other people think about him. He may feel anxious if he has been insincere in his show of loyalty or love and something threatens to remind him sharply of his insincerity.

A person is likely to be vulnerable to a fear of exposure, including especially a fear of facing the truth about himself, if he finds it necessary to assume a false role because of some weakness in his personality, such as a deep-seated conviction of inferiority, a need to compensate by artificial means for what he regards as a defect within himself, or a need to counteract feelings of self-disparagement and self-contempt. The anxiety of possible self-exposure is likely to be more acute if something threatens to disturb an unhealthy but deeply entrenched way of dealing with problems in a person's life. The less he can accept himself, his limitations and his strengths, and the less he can face life forthrightly, the more he will need to work for such ulterior or artificial goals as mastery, competitive triumph, power, prestige, or other external means of making up for his lack of genuine self-esteem. The more a person depends upon a fabricated system to maintain his self-esteem instead of a forthright use of his own substance and resources, the more precarious his circumstances will be and the more occasion he will have for vague uneasiness and forebodings of disaster.

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[22] The struggles that may be involved in protecting a person's pride and pretenses have been discussed in a revealing manner by Horney, 39 and 40.

We can recognize as a matter of everyday observation of ourselves and others that people differ in the extent to which they are "wise" to themselves—aware of their limitations and prejudices, of temperamental qualities or factors in their personalities and past histories that have an important bearing on their everyday actions, thoughts, and feelings. An individual may present a spotty picture as far as understanding of himself is concerned. He may be quite sharply conscious of certain motives and tendencies that have an important bearing on his behavior, and less clearly conscious of other, equally significant, elements in his make-up. It is reasonable to take the next step and assume that in those areas of his life in which he operates most blindly, of which he is *least* conscious, a person is most likely to incur anxiety without knowing why, and perhaps without even clearly appreciating the fact that he is anxious.

The conflicts and inner disharmonies that underlie anxiety are almost as innumerable and complex as the predicaments of life itself. Some of the conflicts are more easily detected than others. It is not difficult to understand the stress that prevails in a student (or teacher) who is angry and has a strong impulse to strike out in anger but also has a strong impulse to conform, or is afraid of letting his anger show. Such a person, instead of showing anger directly, may show it indirectly (in the classroom he may show it by restlessness, inattention, refusal to learn what he actually has the mental ability to learn, and so on). He may even go to the extreme of expressing the opposite of what he feels, showing friendliness instead of anger. He now not only has a struggle between anger and the promptings that restrain his anger, but he also is putting a false face on his feelings. He has both the burden of the original conflict and also the burden of keeping up the pretense. Such a pretense is not easy to maintain.

If this situation is kept in mind, we are not so much faced with an apparent contradiction when we read in the newspaper that one of the "nicest" boys or girls in the high school has committed a violent crime. The tension that arises in such a condition helps to explain many other actions that seem "out of character," as when a mild-mannered teacher who serenely has insisted that "a soft answer turneth away wrath" suddenly storms out of a staff conference where someone has mildly questioned one of his opinions.

Conflicts that generate anxiety often arise in connection with sex impulses. Sometimes this anxiety is openly acted out; at one extreme, a person may try to blunt his conflict by being promiscuous, at the other extreme, a person may cope with his conflict by being rigidly prudish. Both may be equally anxious even though, from an external point of view, the former is immoral and the latter is morally upright. Again, the conflict may not openly show, but be acted out in imagination, as happens when an adolescent in his fantasies indulges in sexual orgies, avoiding any overt sex behavior; but his fantasies may not spare him from feeling guilty.

Among the many other conflicts that give rise to anxiety or are symptoms of anxiety, we mention only a few. In the school situation (as in other walks of life) we constantly meet disharmonies between what we practice and what we preach; what we claim to be our motives and what actually impels us. Such disharmonies exist, for example, when a teacher deliberately or unconsciously pretends to be democratic, but actually is not; or pretends that he is interested in cultivating his students' minds but uses his academic position to vent his hostility on students who can't strike back; or pretends that he is genuinely interested in scholarship but actually is using his learning because of a compulsive need to outshine others; or attacks students in a graduate seminar, not in order to correct the students' views, but to strike out at colleagues who are the students' advisers; or when a teacher who is afraid of facing his own problems, acrimoniously maintains that teachers who are concerned about their students' and their own personal problems are unscholarly; or when a teacher, in order to keep his job or to convince himself that he is doing something worthwhile, stoutly maintains that his subject matter is extremely important but secretly feels that much of what he teaches and requires others to learn is rather meaningless; or when educators claim they are dealing with "basic human needs" and then prepare a course of study or a teaching manual in which they deliberately avoid any attention to fears, grievances, anxieties, or perplexities about sex that are the concern of every student.

Disharmonies such as the foregoing, and others that might be named, are probably so common in the teaching situation that we should regard them as examples of predicaments that none of us can evade. So, if those of us who have taught, and readers who are soon to teach, are described in some way by the illustrations above, let us not feel that we have been singled out for reproach. The important thing, however, is to recognize that any discrepancy within the value systems that any of us has learned, or any posture, pose, or pretense that we adopt to eliminate difficulties, means that we are in conflict with ourselves. One way to deal with this is to ignore the fact that in education (as in other vocations) there is a great amount of duplicity; another way to deal with it is to deny that this exists; yet another way is to face, as realistically as we can, the fact that it does exist.

Perception, feeling, and impulse as related to anxiety. Often when emotion occurs it is possible at the moment (or as an afterthought) to detect three psychological components of the experience: *perception* of the exciting or disturbing event (a snarling dog approaches, and we perceive him as dangerous); *feeling* (we feel afraid); and *impulse* (we have an impulse to run or to defend ourselves). In a condition of anxiety the perception and the feeling components are often blurred, and the impulse often is deceptive.

There is a faulty perception, for example, when a student who is deeply troubled by a mild criticism perceives the criticism as the reason for his distress without recognizing that he takes the criticism so hard because of his great inner need for approval, or because the criticism activates an old grievance against others, or a feeling of guilt, or a strong tendency to feel that he is worthless.

The *feeling* component in the experience of an anxious person may take many forms. In everyday speech we often refer to anxiety as a kind of fear; but the anxious person may not have any clear awareness of being afraid. The feeling tone may be one of anger. Such would be the case if the student in the example cited above has a feeling of bitter resentment against the person who criticized him. Often when a person is angry, it is more instructive to ask, "Why is he so anxious?" than to ask, "Why did that make him so angry?" Again, the feelings connected with anxiety may appear as a kind of depression, melancholy, or gloom, or as a feeling of being uneasy or "on edge." Further, an anxious person may not have any feeling that he can clearly detect, as happens, for example, when he says, "I don't know just what I feel," or, "I just feel empty."

The *impulses* connected with anxiety, when openly expressed, may take many turns, ranging from active forms of flight (as in fear) or combativeness (as in anger) or weeping (as in grief) to more passive or muted expressions (such as one sees in a state of despondency). Whenever we see in another, or feel within ourselves, an impulse to overdo or underdo, to overreact or to underreact, we may suspect that a state of anxiety exists. Anxiety may be expressed in a tendency to plunge into a fever and frenzy of activity or in a tendency to be strangely quiet and apathetic. The turmoil aroused within an anxious person may be released through hysterical crying and a flood of tears, but, on the contrary, he may be so overwhelmed that he cannot weep, even though there is occasion for sorrow, cannot retort with an angry word, even though there is reason for rage, cannot recoil in fear or utter a cry that might disclose his anguish and despair.

Among the impulses associated with anxiety there often is an impulse to avoid experiences that might trigger the conflict underlying anxiety. For this reason, an apparent absence of any show of emotion is no clear sign that a person is not anxious. The adolescent or adult may be so anxious about his sexual desires that he carefully avoids any situation that might arouse them. He may be so deeply disturbed by his desire for coming emotionally close to other persons that he carefully keeps himself at a distance as though, at heart, he were detached and devoid of fellow-feelings. He may be so afraid of his hostile tendencies that he carefully avoids the kind of give-and-take in everyday life that is likely to arouse anger. If a teacher says, "I can't remember feeling really angry at anyone during the past year," we might conclude that he is serenely at peace with himself and others. But we probably would be more right in suspecting that he is so anxiously afraid of his own emotions that he cannot allow himself to venture close to the brink of rage.

Anger

In early infancy anger is provoked primarily by conditions that interfere with the child's activities, including restraint of his movements by other persons, and by the thwarting of his desires, such as a delay in feeding when he is hungry.[28] As the child's mental and motor capacities mature, opportunities for anger-stimulation increase, so that anger is aroused not only by actual thwartings or interferences but also by anything that threatens to interfere with his activities, prestige, plans, or desires.

Occasions for anger. The everyday lives of children from infancy through adolescence present almost endless occasions for provocation to anger. Caring for the young child's health and bodily needs often involves restraints of various kinds. They are likely to occur even in the case of a child being cared for by a most affectionate and competent parent—they will be more numerous, of course, if the child is being handled in clumsy, abrupt, and inefficient ways, and still more numerous and aggravating if he is in the care of someone with no real affection for him. When the child acquires the ability to creep, climb, walk and run, and "get into things," occasions for interference multiply. The establishment of routine habits of eating, sleeping, elimination, dressing, and grooming entails further opportunities for thwarting or restraint. As the child enters into social relations with other children, still further occasions for opposition arouse his ire. As he enters the adolescent period, many clashes are apt to occur between his striving for independence and the controls and restraints exercised by his elders. Even a very mild kind of direction and guidance may seem like interference to an adolescent impatient to be on his own.

A child's protests against interference or constraint sometimes take the form of "resistance" or "negativism." All normal children exhibit resistant behavior to a greater or lesser degree from about the age of four months on. Some children, but not all, go through a phase of "negative" behavior around the time of puberty. Owing to the child's lack of understanding, it is inevitable that many of the things done for him and many of the restraints imposed upon him will strike him as a form of opposition rather than as kindness, no matter how competent his elders may be. Resistant behavior does not in itself indicate that parents or teachers have failed in their jobs. Indeed, resistance and self-assertion may be taken as signs of a child's healthy desire to be a person in his own right, with a certain amount of independence and self-direction.

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[28] For findings about and discussions of anger, hostility, and aggressiveness, see 2, 10, 13, 19. 27, 31, 52, 57, 59, 63, 72, 80, 81, and 99.

Although resistant behavior makes for inconvenience, a parent or teacher has more reason for concern if youngsters in his care are compliant in every respect than if they show opposition to a greater or lesser degree. Moreover, it should be recognized that resistant behavior is often also a form of experimentation in social relations, associated with the child's learning techniques of getting along with others and the establishment of his own role. The fact remains, however, that adults vary considerably in the extent to which they are able to forestall more severe forms of resistance or tolerate any questioning of their authority or affront to their dignity.

Factors contributing to arousal of anger. We have already referred to some of the everyday practical factors that may arouse a child's ire. It is possible to list many other factors, but only a few will be noted. Among the most obvious are: needless interferences in the child's everyday affairs; assignment of tasks beyond his ability; lengthy periods of confinement at a desk; demands that he stay with a job out of keeping with his own attention span; procedures that interfere with his accustomed habits; irregularities or inconsistencies in the demands imposed upon him.

Anything by way of real or imagined unfairness or favoritism on the part of a child's parents or teacher in his relations with siblings at home or fellow pupils at school is likely to have an irritating effect. In this connection it may be noted that the annoying effects of discipline imposed by others, or of failure to realize desires, are likely to be relative. A strict but fair teacher may arouse less resentment than a teacher who is very lenient but has obvious favorites. Children in a home where there are few toys and little rich food to share may be far less aggrieved as long as they share alike than children in wealthier circumstances who think that the things in their home are not being fairly distributed. An equal sharing of poverty may be psychologically much less troublesome than unequal sharing of wealth.

A person is also likely to resent any adult technique that seems to him to represent a form of attack upon him. Such attacks need not simply be physical assaults but may occur in innumerable other forms, such as invidious comparisons with other children, sarcasm, belittlement of the child's efforts or abilities, name-calling, allusions to weaknesses or other characteristics concerning which the child is sensitive, and so forth.

Onslaughts against another person are often committed even if no definite words of reproof are spoken and no specific actions taken. For example, a youngster who is constantly unable to hold his own with other children in meeting standards or expectations imposed on a group at school, and who never wins commendation, is, in effect, exposed to unspoken rebuke, even if he is not definitely scolded for his lack of ability. Among the pupils who exhibit "problem behavior" at school one usually finds that a large proportion show aggressive behavior in one form or another, and also that many of these are backward in their school work. It is not surprising that youngsters who are unable to meet school requirements and who have no other outlets or ways of proving their worth become aggressive or show "problems" betraying underlying resentment. What is really surprising is that so many youngsters remain docile in the face of so much provocation.

Many other factors may arouse anger or increase a person's susceptibility to rage. It was noted in one study, for example, that children in households where there were many adults tended to show anger more often than children who lived in households with only two adults.[24] Further, anything that lowers the stamina or strength that a person has at his command for meeting the problems of everyday life may also lower his resistance to anger. Thus, a person weakened by illness may be angered by circumstances that a robust child would take in his stride. A person who is fatigued or suffers from lack of sleep is apt to be angered by situations that otherwise would not disturb him. Many individuals, both children and adults, are especially susceptible to anger when they are hungry. It is a good rule never to start an argument just before breakfast or enter into a quarrel just before supper. A quarrel is likely to be less bitter if the battlers hold off long enough to take a bite of food.

Accumulated annoyances. To understand outbursts of anger that occur in everyday life, as well as evidence of milder forms of irritability and resentment, it is important to realize that such behavior very often arises by virtue of an accumulation of annoyances. This accounts for the fact that a person's outbursts of rage frequently seem to be utterly out of proportion to the occasion. Accordingly, when an adult is enraged by a passing slur or a child shows his temper in response to a minor deprivation, it is well to inquire as to what may lie behind it. What seems to be a trivial affront may touch off wrath that has accumulated over a period of time. Explosions of anger due to an accumulation of tensions sometimes occur in parents or teachers who try to go to unrealistic lengths in being patient, forbearing, and long-suffering.

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[24] See 31.

In dealing with anger, as in dealing with fear, it is important to recognize that subjective, more-or-less hidden factors come into play. As mentioned earlier, a mild criticism may have the effect of a terrible insult if it touches a person at a spot where he is particularly sensitive or vulnerable. Again, as in connection with fear, the individual's pride may be at stake—including false pride, and mistaken attitudes or conceptions that he may have concerning respect that others ought to show for him and deference that they ought to pay him. A person who prides himself on his hard-won and precarious self-control, may be angered by another's show of uncontrolled emotion. The person who is a hard master in driving himself may be angered by weakness and vacillation in someone else. The person to whom praise and flattery are very important may be angered if people fail to lay it on with a trowel. The person who would like to monopolize the discussion himself but isn't quite aggressive enough to do so may be especially angered by a windbag who does most of the talking whenever the two of them are on a committee together.

Displaced anger. Anger is often displaced in the sense of being directed at something or somebody not immediately or directly responsible for provoking it. Such displacement sometimes occurs if the person is hindered from venting his wrath directly, or is afraid to direct his anger against the real offender. The child may smash a toy when angered by his mother. A pupil may "take out" on his forebearing parents anger that has been aroused by his teacher at school. Pupils may bring home-engendered anger to school and take home school-engendered anger.

That a child behaves nicely at school and acts badly at home, accordingly, does not necessarily mean that the school people have better relationships with him than do the people at home. It may mean that he is afraid to show his real feelings at school and therefore feels all the more need to give vent to his anger at home. The reverse may also be true. Another way of saying this is that absence of overtly expressed anger cannot in itself be taken as a sign of good morale or a cooperative attitude. As a matter of fact, conditions may be healthier and the morale situation definitely better in a school where pupils occasionally express annoyance and rebellion than in one where no expressions of anger come to the surface.

Displacement of anger occurs when children or adults find a scapegoat, someone on whom they can unleash their anger even though he is not the one who aroused it. Prejudice against people of another race or religion and prejudice which "haves" and "have nots" feel toward each other may be forms of displaced anger (although many other factors are likely to enter in).

When anger is displaced there is a frequent tendency to find a "safe" whippingboy who isn't able to fight back. Children may fit this purpose very handily. A study of a large sampling of occasions on which big persons strike children would undoubtedly show that displacement of anger is often involved. The big person is using the little person as a whippingboy in the sense that he is not inflicting a reasonable kind of punishment or even paying the child back in kind for what the child has done to him, but is actually venting upon him anger engendered to a large extent by circumstances with which he had nothing to do.

One reason why corporal punishment is popular is that a big person can hit a little person with relative safety. Many parents, it seems, give up corporal punishment when their children are old enough to make a stiff defense or counterattack. A reason sometimes given for not hitting a youngster of ten or twelve is that it is embarrassing and humiliating even though it seemed quite all right when he was younger. Actually, getting a beating at three is probably just as sharply humiliating and degrading as it is at ten.

Displaced anger sometimes takes the form of what appears to be wanton cruelty. Where cruelty is practiced it frequently is directed against weak and defenseless creatures. A person who goes out of his way to be cruel is in a very unhealthy state. He is hostile and charged with grievance against the world and probably himself, but he is too frightened or too weak to make any sort of fair fight. In expressing his hostility he resorts to methods that are probably as degrading to him as they are painful to the helpless creature suffering from his cruelty.

Another means of displacing anger is to direct it against inanimate objects, as when an angry person smashes things, throws stones through windows, breaks the furniture, or commits other acts of violence. A good deal of the destruction of property that takes place in school appears to be a form of angry protest that is directed not at the pupils, staff, or institution as a whole but against the school property. It is deplorable when a pupil deliberately breaks a window, but it would be even more deplorable if he directly expressed his anger by breaking someone's nose.

Anger may also find indirect expression by way of a stand for or against a political group or social policy. A person's devotion to a cause may be motivated by a desire to take action *against* someone or something, and this desire may be prompted by vindictive or vengeful feelings. Such a stand is quite different, of course, from that of a person espousing a cause because he is definitely and spontaneously *for* it.

Utility of anger. The practical values of anger, like those of fear, are too numerous to elaborate upon in detail. It can be noted in passing that a person, by being aroused to anger against others or against himself, may improve his ways, overcome his irresolution or inertia, and proceed to deal constructively with a problem. It frequently happens that children will express thoughts, wishes, or criticisms under the spur of anger that provide valuable insights for their elders. A youngster may explode at school and make the charge that the teacher is always "after him," thus betraying resentments that were not suspected by the teacher and which will cause him to review and perhaps revise his methods of dealing with the youngster.

Likewise, an extreme outburst such as "Why don't you kill me and be done with it?" or "You're always picking on me more than on the other kids," in the home situation may convey to parents quite dramatically the realization that perhaps they have been too severe. For such an expression of anger to have value, of course, the child's elders must be genuinely concerned for his welfare.

Anger has beneficial effects at other times. A child who has been indulged in ways that are unwise, or that represent a form of self-indulgence on the part of his elders, may acquire forms of behavior that annoy them so much that they are practically forced to change their practices. In such a situation, of course, adults are tempted to be annoyed with the child rather than with themselves, but some benefits accrue nevertheless.

An angry child or adult is essentially a person struggling with a problem. Sometimes an outburst of anger, as indicated above, may help to dispose of the problem, but often it serves only momentarily to intimidate others or to substitute for more constructive solutions. A person whose anger becomes habitual in dealing with problems is doubly unfortunate: the tendency toward anger is encouraged by frequent exercise, and the necessity for anger grows greater as the person neglects the development of other techniques for resolving his difficulties. Moreover, much anger is debilitating in its effects. It often involves consumption of energy to no good purpose. This is especially true when anger represents irrational means of evading rather than of coming to grips with a problem.

Anger can be turned to useful purpose if a teacher can ask himself and encourage pupils to ask themselves, soon after a moment of anger: Why did I get so mad? Why did *that* make me so angry? Such an inquiry, if sincerely pursued, can often teach a person a great deal about himself. He may discover that anger which he regarded as "justified" really occurred because he had a chip on his shoulder, felt overly sensitive, carried too many grievances, or expected too much of himself and others. But here we face a paradox, for just as it may be useful to ask oneself, "Why did I get so angry?" there are times when it might be quite as illuminating to ask, "Why did I *not* get angry?" This question is very pertinent if a person stands by without anger when others are subjected to abuse and injustice or if he is so afraid of his anger that he does nothing to prevent others from abusing him.

Pleasures and satisfactions

According to one view, pleasure occurs only through the alleviation of an irritant; according to another, pleasure may arise as something "positive," as an experience added to an otherwise "neutral" state. Both views depend largely upon an arbitrary definition of terms, and need not delay us here.

A list of possible broad types of satisfactions would extend from the vegetative satisfactions associated with hunger, thirst, elimination, and sex; range through the countless alleviations of local irritations; and continue on into the pleasure associated with one's activities.[25] These "activity" pleasures concern us most here, for they are important from an educational point of view. As noted earlier, pleasure may arise through the exercise of any capacity with which the individual is endowed. Early in the child's life we see him obtaining apparent pleasure from his "spontaneous" activities—thus, as an infant he "plays" with his arms and legs. As he matures, his play keeps pace with his growing abilities. Much of this activity seems to serve as an end in itself rather than as a chosen means to an ulterior end. As the normal child's motor and mental abilities mature, he seeks activities that are a proper challenge to his powers.

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[25] For accounts of certain aspects of pleasurable emotions, see 12, 20. and 55.

When we contrast the infant who eagerly undertakes activities that seem sufficient in themselves but actually foster his self-improvement, with the older child who often seems lazy in matters that affect his welfare, we may well ask what makes the difference. Does a change occur some time in childhood, so that ulterior incentives become necessary where previously the child was gainfully active on his own accord? The answer in many educational writings has been that the teacher should prevent this hiatus by operating only through activities that fall within the child's own sphere of interests. However, to build only upon interests that a learner happens to have already acquired may mean that other potentialities will be neglected.

A most important principle in education is that the learner's opportunities and assignments should be scaled to his abilities in order to capitalize on his pleasure in activity. To try to teach a child to talk or walk, for example, before he is sufficiently mature is wasted effort and may cause much irritation. Failure to recognize this principle often gives the flavor of onerous work to an undertaking that may be attractive in its own right if presented to the child when he is older and abler. For many generations the school system has assigned certain subjects to all children in a certain age group or grade without adequate consideration of whether each subject was suited to the average pupil at the assigned age or grade, and with much less consideration of whether the subject was suited to the individual pupil. There is room for a thoroughgoing examination of the entire school program from the point of adjusting various projects and levels of difficulty to children's abilities at various levels of maturity.

Also needed in the hoped-for bridging of the gap between work and play in the life of the average child is a better knowledge of children's needs and concerns, their goals and strivings for self-fulfillment.

Emotional maturity

One outcome of healthy emotional development is increasing "emotional maturity." Emotional maturity should be regarded as relative, not final or absolute. Two-, four-, or six-year-olds are "emotionally mature" if they show capacity for emotional behavior that is true to their level of development even though all three groups are quite immature compared with the eighteen- or twenty-year-old. The process of maturing emotionally is never complete, for a person in fairly good health mentally continues to grow more "mature" in his attitude toward life and toward himself as long as he lives. Therefore, when we say that a major aim of a good educational program is to help learners to gain in emotional maturity, what we mean is not the achievement of a certain end-product that can be graded or rated on graduation day, but rather seeking to help the child in a process of development that continues long after most people leave school.

Many attempts have been made to define "emotional maturity." In psychological writings the definition of maturity has frequently been a rather negative one. That emotional maturity essentially involves emotional *control* has been a prominent feature in some definitions. According to this view, the emotionally mature person is able to keep a lid on his feelings. He can suffer in silence; he can bide his time in spite of present discomfort. He is not subject to swings in mood, he is not volatile. When he does express emotion he does so with moderation, decently, and in good order. He is not carried away by his feelings. He has considerable tolerance for frustration, and so on. Actually, in the writer's opinion, a person can live up to all of these prescriptions and still be an abjectly immature person, as well as a very cold, unemotional person.

A definition of emotional maturity that is in keeping with the facts of development and the potentialities involved in the process of development must stress not simply restriction and control but also the positive possibilities inherent in human nature. According to this view, emotional maturity involves the kind of living that most richly and fully expresses what a person has in him at any level of his development.

"Mature" emotional behavior at any level of growth is that which most fully reflects the fruits of healthy development in all the interacting aspects of the growing person's make-up. An adequate description of emotional maturity must take account of the full scope of the individual's capacity and powers, and of his ability to use and enjoy them. In its broadest sense emotional maturity means the degree to which the person has realized his potential for richness of living and has developed his capacity to enjoy things, to relate himself to others, to love and to laugh; his capacity for wholehearted sorrow when an

occasion for grief arises; his capacity for experiencing anger when faced with thwartings that would rile the temper of any reasonably tolerant or sensible person; and his capacity to show fear when there is occasion to be frightened, without feeling a need to use a false mask of courage such as must be assumed by persons afraid to admit that they are afraid.

Summary

The feelings and impulses that constitute the emotional life of the child are interwoven with all his thoughts and actions. At birth the child does not show readily distinguishable signs of fear, anger, joy, or grief. With the passage of time more clearly differentiated patterns emerge. With the further passage of time, the child increasingly acquires the ability to moderate his display of emotions so that it becomes more and more difficult for the adult to know whether the child is angry, afraid, or depressed.

As the child becomes older, he also becomes better able to disguise his feelings or express them in ways that do not clearly reveal what it is that disturbs him. For this reason, adults who would understand the child must try to look beneath the surface signs of emotion. To do so they must, as far as possible, understand their own emotions. A person's understanding of others is not likely to exceed his understanding of himself.

As a child matures, as his activities and interests expand, and as he gains in understanding of the world about him, the circumstances that arouse his emotions change. The young child, relatively helpless and lacking in understanding, is frightened or angered by events that he can later handle quite casually. On the other hand, he is unaffected by many events that disturb him at a later level of maturity, when he is better able to perceive what is at stake. In like manner, he may be delighted by happenings that will later bore him, and be impervious to happenings and opportunities that will later give him a thrill. At all ages a person's ability to learn, his freedom to venture, to try himself out, to use his capacities will be influenced by his emotions.

In early infancy the child's physical and emotional well-being and his freedom to express himself and learn depend heavily upon the care and affection he receives from others. From an early age he is also capable of showing affection for others. As he matures, the assurance that he can count on the affection of his elders continues to be an important factor in his life. As he grows older, also, it becomes increasingly important for him to be accepted by his peers.

Throughout the period of development, children have an impulse to exercise their growing capacities. A major source of satisfaction comes from opportunities to put their abilities to use. Boredom, resentment, and sometimes fear will arise if they are made to sit idly in school, or to go through the same familiar motions again and again, or if they are assigned to tasks beyond their abilities.

To deal with a child who is angry or afraid, one needs to look not only for specific conditions that thwart or frighten him but also for conditions in the general background of his everyday experience and personality development that influence his tendency to be angry or afraid. To understand the child who is anxious, and to look beneath the many disguises of anxiety, it is important for the teacher to try to face his own anxieties.

QUESTIONS AND EXERCISES

for discussion and study

1 Prepare a list of a number of ways in which a pupil may express his anger at a certain teacher or subject or at the school as a whole.

2 From your own observation and experience, what are some of the environmental conditions (including parents' and teachers' practices) that seem especially anger-provoking in childhood?

3 Think of the two or three most irascible and the two or three least irascible children or adults you know and try to analyze the factors that you believe may be responsible in each case.

4 What are some of the many factors that may contribute to the development of a child's fear of the dark? His fear of death and corpses? Of failure and ridicule?

5 Why is it that a policy of ignoring the child who is timid and afraid at school and a policy of "doing something" about the child who is angry and rebellious may have the result of aggravating the tendencies that each child already shows?

6 Suppose you were dealing with an exceedingly shy person and had to make an exclusive choice of opportunities in the following two directions: (a) probing into his past life to try to reconstruct and clarify to him the conditions that contributed to his shyness, or (b) cultivating various skills, such as dancing, sports, card-playing, and so on. Which would you choose. for what reasons, and under what conditions?

7 What are some conditions or events in daily life that suggest that human beings are by nature sympathetic towards their fellow men, and what reasons may be found to support just the opposite conclusion?

8 Make a list of your childhood fears as best you can recall them. Examine the list with a view to providing information with respect to: causes, effects on everyday behavior, persistence of the childhood fear into adult life, means by which the fear was overcome.

9 If possible, observe the everyday behavior of children of various ages, noting emotional expressions such as laughter, crying, evidences of joy, anger, and fear. Classify. What appear to be the causes of emotional outbursts at the different age levels? Note instances, if any, in which an unpleasant outburst might have been prevented, and factors in the behavior of others or in the child's physical environment that appeared to precipitate emotional responses.

10 Consider children you know, or acquaintances (or yourself), and try to find illustrations of symptoms of "rejection" as discussed in this chapter.

11 In the light of sections in this chapter dealing with affection, anger, and anxiety, what would you say is the basis for the statement that the intellect is not free when the emotions are fettered?

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CHAPTER **11**

Social development

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Meaning of socialization

Introduction. In previous chapters, *growth* and *development* have been considered from several angles. The *genetic aspects* of growth processes have been described. Emotion, attitudes, interests, and abilities have been treated in their respective relations to the process of growth. It is to be noticed that the emphasis has been based primarily upon the *individual.* The maturing and growing child, however, develops not only in *physical, mental,* and *emotional behavior,* but also correspondingly in social functioning and character. Gates points out the relationship of these various phases of growth:

> The widening of a child's range of social activities parallels and is interwoven with other features of his growth. Many of the early signs of intellectual growth, for example, appear in connection with a child's response to other people, such as the development of the ability during the first month of life to distinguish between persons and other objects, the ability later to distinguish between the mother and other persons, between playful tones and gestures and other sounds and movements.
>
> The interrelation of mental and social behavior is seen especially in the development of language, which involves intellectual symbols and also operates as a means of communicating with others. Even the mental processes involved in private thinking have a social orientation, for frequently in his thoughts a person is trying to formulate answers in such a manner that he can communicate them to others. As the in-

> dividual argues with himself, in weighing and rejecting alternatives, he is, in effect, marshaling his logic (or rationalizations) in a manner that might convince other persons. In like manner, an individual's social and emotional behavior is interwoven in complex ways, so closely, indeed, that it is only by arbitrary definition that phenomena such as jealousy, shyness, stage fright, affection, and sympathy are treated predominantly as "social" or "emotional" forms of behavior.[1]

It is the purpose of this chapter to examine the nature of the growth resulting from social functioning, and also to trace some of the formative factors in character, the most important single result of social functioning.

Socialization. Socialization is a significant process only when its basic factors are comprehended. Unfortunately, it is not possible at the present time to state with complete certainty all the basic and fundamental elements in socialization or the mechanisms in its formation. But we do know that, as Kluckhohn and Murray point out:

> Beginning in the nursery, the process of socialization continues throughout life. Among other things, what must be learned is: the power to inhibit, or to moderate, the expression of unacceptable needs; the ability to transfer cathexis from a prohibited goal-object to an acceptable substitute; the habitual and automatic use of a large number of approved action patterns (methods, manners, and emotional attitudes); and the ability to adapt to schedules (to do things at the proper time, keep appointments, etc.). It is assumed that, having acquired these abilities, the average person will be capable of establishing satisfactory interpersonal relations within the legal and conventional framework of society. When the child begins to behave in a predictable, expectable manner it is well on the road to being socialized.[2]

Socialization must arise from definite organic and environmental factors in the same way that all human conduct does. For the purposes of this discussion, these basic factors are taken to be *the same physiological equipment with which man confronts all his problems.* These basic factors include, among other things, (a) the basic characteristics of protoplasm itself,[3] (b) certain original mental equipment, which comprises the organization of the nervous system, more particularly the cerebral cortex, and (c) certain affective or emotional equipment, which comprises more particularly the ductless glands.[4] In the process of socialization, man acts in the only way in which he is able to act—namely, in accordance with his hereditary equipment, which consists of the foregoing elements and not of a group of instinctive entities. Socialization is a complicated process involving many complex factors. In this connection Lair states:

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[1] A. I. Gates, *et al.*, *Educational Psychology* (3rd ed.; New York: The Macmillan Company, 1948), p. 124. Used with the permission of The Macmillan Company.

[2] C. Kluckhohn and H. A. Murray (eds.), *Personality in Nature, Society, and Culture*, (New York: Alfred A. Knopf, Inc., 1949), p. 25.

[3] F. F. Powers and W. L. Uhl, *Psychological Principles of Education* (New York: Appleton-Century-Crofts, Inc., 1933), p. 23.

> This development of the child is all the more remarkable when we consider the magnitude of the task. The impatient, self-centered, pleasure-seeking infant, concerned only with himself and with his own survival, is somehow induced within the child-parent relationship to defer his pleasures, consider others, become educated, develop self-control and eventually to assume some degree of responsibility in his society. This important process cannot be taken for granted as something that occurs inevitably and automatically; we have too many failures in socialization in our society for that, as the great number of delinquents, neurotics, and the maladjusted about us reveal. Mother-wisdom, valuable as it is, is inextricably related to personal adjustment and cultural patterns; instinct alone does not provide a guide.[5]

Habit and socialization. On the assumption that such a document as *The Wild Boy of Aveyron*[6] (which describes the antisocial conduct of a boy who was lost while very young and who lived alone in the wilds until found) represents an even reasonably accurate recital of events, it must be recognized that, though its genesis is not in some mysterious "instinct," socialized behavior represents a complex and systematic development. The obvious alternative is that the essence of both socialization and character is *habit formation.* Examination of events in everyday life gives much weight to this opinion. It has been stated previously in this chapter that socialization rests upon exactly the same foundation as all other learning——conditioning, association, and practice. This emphasis is reiterated here, and is found both logically and psychologically to be borne out by common observation. The words "mores," "morals," and the like, give clear evidence of the early recognition of the role of habit formation in the socialization of both the individual and the group (*mores*, Lat. = social habits).

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[4] J. F. Dashiell, *Fundamentals of General Psychology* (Boston: Houghton Mifflin Company, 1937), p. 222.

[5] W. S. Lair, "Identification in the Socialization Process," *Peabody Journal of Education*, XXVI (Jan., 1949), 212.

[6] J. Itard, *The Wild Boy of Aveyron*, G. Humphrey and M. Humphrey, trans. (New York: The Century Company, 1932).

Definitions. (1) *Social growth can be defined as the progressive improvement, through directed activity, of the individual in the comprehension of the social heritage and the formation of flexible conduct patterns of reasonable conformity with this heritage.* (2) *Character can be defined as consistent conduct trends, outer and inner.*

A brief examination and explanation of the foregoing definitions is in order. The expression "social growth" implies that the growth is the result of activity. Usually such action involves choice. The importance of this factor has led McGuire and Havighurst to develop their conception of socialization around this thesis. They propose this definition:

> *Socialization* is the process of presenting alternate channels for individual behavior together with positive and negative sanctions which will lead to acceptance of some and rejection of others. It emphasizes the influence of social groups, formal and informal, upon the personality of the individual.[7]

Social growth is the result of *social functioning under a particular set of circumstances.* Furthermore, the growth must be progressive. It must pass from one level to another. Tryon and Henry have said:

> Two essential aspects of living organisms are the need to change, to grow and differentiate toward greater complexity, and the need to integrate and to maintain equilibrium and wholeness, to consolidate our gains. But this latter never means the static "adjustment" of the well-oiled functioning of the machine in good working order. Rather we must think of the individual's adjustment as a process in which, through interacting with his environment, he deals with his adjustment needs continually. He behaves in certain ways in order to maintain equilibrium or to relieve the tensions that come from imbalance.[8]

Doll, whose work we shall examine presently, has formulated the characteristics of social growth and functioning at age levels from one to thirty years. His statement is based upon experimentation, and the implications are the foundations for the definition given herein. The thing to be especially noted from both this work and that of similar investigators is the *progressive* nature of social growth. To secure this progressive quality, the activity of the individual must be *present* and also *directed*. The home and the school, with which we are particularly concerned as teachers, are the basic directive agencies. Further on in this discussion a statement will be made of the primary factors that the school should contribute to the direction.

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[7] C. McGuire and R. J. Havighurst, "Social Development," *Review of Educational Research,* XVII (Dec., 1947), 345.

[8] National Society for the Study of Education, *Learning and Instruction,* Forty-ninth Yearbook, Part I (Chicago: University of Chicago Press, 1950), p. 156. Quoted by permission of the Society.

The definition further implies that the individual must comprehend or understand the social heritage of his own group, and form conduct patterns or habits that will bring him into effective adjustment to this heritage. This process is complicated by the many subgroup cultures organized around such items as age, sex, occupation, and status. Each of these subgroups has its own distinct cultural pattern that the individual must accept and follow in addition to the general cultural pattern of his particular environment. *Complete* and *unquestioning* conformity of the individual with, and adjustment to, any social heritage means, of course, a static society. But the individual who is persistently and completely at odds with the mores of his group is a small contributor to orderly progress, personal or social.

As the child, partly through his own spontaneous activity and partly through his reaction with the environment arranged by his parents, teachers, and friends, forms habits that become well set, his true "*character*" is in process of formation. *Character is the deepest and most lasting result of the progressive activity that leads to social growth.* It has been defined here in terms of conduct, both outer and inner, because an objective unit of conduct, when accurately described, can be understood by everyone. When character is described in terms of traits, and particularly when these traits take on the aspects of "good" or "bad," understanding is lessened because of the differences in point of view in various times and places.[9] Two other things are to be noted about this definition of character. First, the element of consistency is stressed. Second, the expression "outer and inner" implies that the essence of character is found not only in the things that we do and can be observed doing by other people, but also in covert reactions. This emphasis is in accord with common sense observation and everyday fact. "As he thinketh in his heart, so is he" is a saying that pictures the angle of character residual within the individual and sometimes not observable to others.[10] It is not our purpose to go into a lengthy discussion as to the nature of the "inner" conduct. Whether this conduct consists of ideas, thoughts, and the like, or merely, as the behaviorists would have us believe, subvocalization and certain nervous activity, is still an open question. Most fortunately for school teachers and their pedagogical procedures, it is not necessary to make an absolute decision. For purposes of training, the antagonistic cases of behaviorism and purposivism may be reconciled—both definitely admit the influence of practice and training upon these inner processes. Even theology, a form of speculation abjured by behaviorists, readily grants the conditioning and habituating effect of the continued indulgence in "good" or "bad" thoughts.

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[9] For an expansion of this point of view, see A. Korzybski, *Science and Sanity* (3d ed.; Lakeville, Conn.: International Non-Aristotelian Library Publishing Co., 1948).

[10] Proverbs 23:7.

Genesis of socialization

It has been pointed out by Lewin that the individual, including the child, is essentially a "closed system."[11] Uhl has emphasized the same point when he says that every child starts life as an egoist, regarding the world as *his* world and expecting much from it.[12] Lewin further points out that the child is what may be termed a "dynamic unity."[13] When we say that the child is a "dynamic unity," we mean that his behavior tendencies are toward whole body reactions that are comparatively undifferentiated in terms of stimuli selection.

The genesis of social functioning and character formation, then, presents two major problems to parents and pedagogues: the change of the predominantly egoistic infant to an adult in intelligent rapport and adjustment to his social environment, and the training of the child to act in specialized ways to specific categories of stimuli and situations. These two problems will be considered briefly and separately.

In attempting to prevent the setting of the individual's character and personality in too egoistic a mold, the firmness of the boundary between the individual and his environment must be diminished.[14] Some of the first steps in breaking down the barrier between the child and society are described by Crow and Crow:

> The young child's play activities illustrate a progressive change from individualization toward socialization. At the age of two months, an

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[11] K. Lewin, in C. Murchison (ed.), *Handbook of Child Psychology* (Worcester, Mass.: Clark University Press, 1931), pp. 120-123.

[12] Powers and Uhl, *op. cit.*, chap. 5, "Socialization as Individual Development."

[13] Lewin, *op. cit.*, *passim.*

[14] Lewin, *op. cit.*, p. 120.

> infant can be expected, for instance, to hold a small block that is given to him. Later, he appears to gain satisfaction from manipulating blocks and other simple toys, but he plays alone. The child of two years will play with his own toys in his own corner of the room, even though another child is playing with toys in another part of the room. The only awareness of the other child that is exhibited is his attempt to take the toy with which the other is playing. This behavior may result in a tug of war between the two children for the possession of the toy.
>
> Gradually, the concept of *I* as opposed to *you* has more meaning for the child than it did earlier. Other children are brought into the child's life. He still acts in accordance with the policy that *what is mine is mine,* but he also is gaining in understanding of the fact that *what is yours is yours.* As the child approaches his third year he may come to realize that *what is mine is yours also.* During this period children have been known to be very generous with their toys and other belongings. It is not until the end of the third year, however, that cooperative play rather than parallel playing becomes relatively fixed.[15]

In the early stages of child training it is frequently necessary to give the child the impression that the conduct tendencies or lines of the world converge upon him. During this rather lengthy period of human infancy, however, when the child is cared for assiduously by his environment, and, more especially, by his social environment, there is likely to be developed an attitude of dependence on others and the feeling that the world is his world. The longer such a period is prolonged, the more firmly set becomes this habit, and the more pronounced becomes the personality closure. For this reason, many of the psychological treatises on the care of children recommend early training calculated to make the child aware that his future existence will be spent in an environment in which a reciprocal functional relationship obtains between him and the environment.

Teaching the child to respond to specialized categories of stimuli with specialized responses in conduct is also requisite. One of the first conduct refinements of this sort is the differentiation between things and persons and the appropriate response to each. Griffith has given an excellent statement of this point. He says:

> The general setting for the development of social behavior is found in the gradual emergence during early childhood of the distinction between what we may call thing-techniques and person-techniques. As we have already discovered, the phrase "thing-techniques" refers to the fact

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[15] L. D. Crow and A. Crow, *Educational Psychology* (New York: American Book Company, 1948), p. 111.

> that the objects and events around the child may be taken as simply impersonal or physical in nature. They may, for example, be pushed, pulled, or otherwise manipulated, but in no sense of the word invited, persuaded, or cajoled. This means that person-techniques do involve invitation or persuasion.[16]

This differentiation of response is made not only to persons and things, but also at a later time must be made in connection with all mental functions.[17]

Certain general characteristics of infant behavior upon which social functioning is conditioned can be noted. Without implying that child and adult behavior are *qualitatively* different, it may be observed that child conduct has certain *quantitative* emphases. Thus, the behavior of children is comparatively:

1. *Random.* Not all infant conduct is unintelligent and without purpose, but, especially in the early stages, there is much activity that from the adult criterion of "purposiveness" seems random.
2. *Diffuse.* The dynamic unity of infant behavior. especially in the performance of tasks which require the accurate functioning of individual muscle groups, produces the general effect of diffusion.
3. *Undifferentiated and unbalanced.* In addition to the lack of differentiation, infant conduct is likely to be unbalanced, in terms of both external muscle control and internal coordination.
4. *Non-centralized.* The child's objectives of his conduct shift rapidly. Persistent centralization of effort is lacking.
5. *Transitory.* A lack of sustained attention to one class of objects is a general characteristic of infant behavior.
6. *Immediate.* All teachers know how difficult it is to motivate subjects whose value lies in contribution to a future need since most infant behavior is devoted to the satisfaction of immediate needs.

On the foregoing characteristics, then, and similar ones must be built the structure of social functioning and character formation.

Character as socialization

It has been stated hitherto that the most important single product of social functioning is character. There is an excellent reason for this.

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[16] C. R. Griffith, *Introduction to Educational Psychology* (New York: Farrar & Rinehart, Inc., 1935), p. 609.

[17] For a discussion of the mental functions of problem-solving, acquisition of knowledge, acquisition of skill, social competence, creative activity, and aesthetic experiencing, see Powers and Uhl, *op. cit.*, chap. 3.

The child is born into a world that allows certain tolerances and leeway for the individual, although it is nevertheless set in many ways. To this world and to the people in it the child must adjust himself. His character, which we have defined as his consistency in conduct trends, outer and inner, must, if he is to be a socialized individual, maintain a reasonable conformity with the group in which he lives.

Levels of social maturity

Importance of social levels. We sometimes hear the derogatory expression, "He behaves just like a child." The implication of such a statement is that some forms of conduct which might be considered quite appropriate in a child are taken as evidence of social immaturity in an adult or older person. The further implication is that one should progress from one stratum of social conduct to another.

Definition of social levels. Levels of conduct, social or otherwise, are not easily defined. Human conduct is so complicated, and judgments of it may be made from so many different angles, that it is most difficult to secure any agreement, even among students of systematic psychology, upon a question so significant as that of whether or not levels of conduct do exist at all.

In attempting a definition of social levels, one must make certain negative stipulations. "Levels," as here used, does not refer to innate differences or those caused by heredity. That such innate levels in both general and specific ability exist cannot be gainsaid, but it is not the purpose of this chapter to consider them. The fact, however, as expressed by Sandiford, that intelligence exhibits both horizontal and vertical growth phenomena, is herein recognized and admitted.[18] Put plainly, the concept is this: Some functions can be discharged with comparatively little "brains." Other things require a much more complicated mental process. These "mental-brain" levels range vertically from the idiot's mental age level to that of the supreme genius. But, at *any upward* level, horizontal growth may be very extensive. Sometimes growth at a given horizontal level is confused with a higher vertical level. Many individuals get the reputation of being learned and possessing a profound intellect who have merely a vast acquisition of facts, the learning of any one or even an aggregation of which required a fairly low level of ability on the vertical scale.

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[18] P. Sandiford, *Educational Psychology* (New York: Longmans, Green & Co., Inc., 1933), p. 150.

Frequently a person with plenty of mental ability to master a given set of facts, including the social, fails to do so, for it is possible at any mental age level for one to exhibit conduct that, although on a horizontal plane, is still progressive and sequential in nature. This is exactly the nature of social levels. Practically every normal individual is mentally *capable* of mastering the mores of his group, but many people do not do so. Those who do not are at a low *stage* of social maturity. (To avoid confusion of vertical and horizontal levels, the word "stage" is used to denote *extent* of development at any level.)

The question arises as to whether all social adaptations require only normal ability. This is not literally the case, although it is practically so. The upper reaches of social technique as possessed by highly adjusted persons probably require a translation into upper mental ability levels likewise. For example, a part of social adjustment is purely muscular and motor and is found in such things as correct posture, carriage, and bearing. If given sufficient practice, most persons with a normal body can make these motor adjustments. But, as Leary points out in his discussion of reasoning and higher levels of learning, social adaptation is complicated, abstract, and highly verbalized.[19] The level of social adjustment and socialization that a person has attained is indicated by the relation between his conduct and the normal adjustment for his age and group in motor, emotional, and abstract mental control.

Testing social maturity. How, then, are we to know whether Willie, aged three chronologically, is aged three socially? There are several ways in which one could get at the matter. He might, for example, attack it in an entirely *a priori* fashion by sitting down with pencil and paper and noting what, in his opinion, the three-year-old child should know in the way of social behavior. Foolish as this may sound, it has been done, and curricula have been so organized. Otherwise, elementary-school pupils would probably never have been asked to read, for purposes of enjoyment, Burke's "Essay on Conciliation"!

Another technique, similar and but slightly better, could consist of asking a large number of adults what kind of social conduct should be expected of children of various ages. This also has been done and with somewhat better results. Far more to the point, however, is Doll's technique. He experimented for nearly twenty years to develop social maturity tests. These tests are not intelligence tests or measures of vertical mental ability, but are true social maturity scales. Doll's technique is strictly *a posteriori* in nature, and consists not of speculating upon what children can or should do at any given age, but rather of observing what normal children (and subnormal, too, for that matter) actually do in a learning situation that is well motivated and within their ability. This approach has resulted in a definite and specific list of functional activities graded by years. If research tends to confirm his findings, we shall have an objective norm against which to check social responsibility and social competence at any age level. The purpose of the Vineland Social Maturity Scale, according to Doll, is to "quantify the evaluation of social competence as a global aspect of individual maturation at successive age levels."[20] This scale, reproduced herewith, indicates the significant social behaviors characteristically (but not invariably) found at the several chronological age levels.[21]

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[19] D. B. Leary, *Educational Psychology* (New York: Thomas Nelson & Sons, 1934), p. 197.

Vineland social maturity scale*

O-I

Categories†	*Items*	
C	1.	"Crows"; laughs
S H G	2.	Balances head
S H G	3.	Grasps objects within reach
S	4.	Reaches for familiar persons
S H G	5.	Rolls over
S H G	6.	Reaches for nearby objects
O	7.	Occupies self unattended
S H G	8.	Sits unsupported
S H G	9.	Pulls self upright
C	10.	"Talks"; imitates sounds
S H E	11.	Drinks from cup or glass assisted
L	12.	Moves about on floor
S H G	13.	Grasps with thumb and finger
S	14.	Demands personal attention
S H G	15.	Stands alone
S H E	16.	Does not drool
C	17.	Follows simple instructions

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[20] E. A. Doll, "The Relation of Social Competence to Social Adjustment," *Educational Record*, XXIX (Jan. 1948), 81.

[21] E. A. Doll, *Vineland Social Maturity Scale* (Manual of Directions) (Minneapolis: Educational Test Bureau, 1947), pp. 3-8.

Vineland social maturity scale* (Cont):

I-II

Categories†	*Items*	
L	18.	Walks about room unattended
O	19.	Marks with pencil or crayon
S H E	20.	Masticates food
S H D	21.	Pulls off socks
O	22.	Transfers objects
S H G	23.	Overcomes simple obstacles
O	24.	Fetches or carries familiar objects
S H E	25.	Drinks from cup or glass unassisted
S H G	26.	Gives up baby carriage
S	27.	Plays with other children
S H E	28.	Eats with spoon
L	29.	Goes about house or yard
S H E	30.	Discriminates edible substances
C	31.	Uses names of familiar objects
L	32.	Walks upstairs unassisted
S H E	33.	Unwraps candy
C	34.	Talks in short sentences
		II-III
S H G	35.	Asks to go to toilet
O	36.	Initiates own play activities
S H D	37.	Removes coat or dress
S H E	38.	Eats with fork
S H E	39.	Gets drink unassisted
S H D	40.	Dries own hands
S H G	41.	Avoids simple hazards
S H D	42.	Puts on coat or dress unassisted
O	43.	Cuts with scissors
C	44.	Relates experiences
		III-IV
L	45.	Walks downstairs one step per tread
S	46.	Plays cooperatively at kindergarten level
S H D	47.	Buttons coat or dress
O	48.	Helps at little household tasks
S	49.	"Performs" for others
S H D	50.	Washes hands unaided

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† Key to categorical arrangement of items:

SHG—self-help general
SHE—self-help eating
SHD—self-help dressing
SD—self direction

O—occupation
C—communication
L—locomotion
S—socialization

Vineland social maturity scale* (Cont):

Categories†	*Items*	
		IV-V
S H G	51.	Cares for self at toilet
S H D	52.	Washes face unassisted
L	53.	Goes about neighborhood unattended
S H D	54.	Dresses self except tying
O	55.	Uses pencil or crayon for drawing
S	56.	Plays competitive exercise games
		V-VI
O	57.	Uses skates, sled, wagon
C	58.	Prints simple words
S	59.	Plays simple table games
S D	60.	Is trusted with money
L	61.	Goes to school unattended
		VI-VII
S H E	62.	Uses table knife for spreading
C	63.	Uses pencil for writing
S H D	64.	Bathes self assisted
S H D	65.	Goes to bed unassisted
		VII-VIII
S H G	66.	Tells time to quarter hour
S H E	67.	Uses table knife for cutting
S	68.	Disavows literal Santa Claus
S	69.	Participates in pre-adolescent play
S H D	70.	Combs or brushes hair
		VIII-IX
O	71.	Uses tools or utensils
O	72.	Does routine household tasks
C	73.	Reads on own initiative
S H D	74.	Bathes self unaided
		IX-X
S H E	75.	Cares for self at table
S D	76.	Makes minor purchases
L	77.	Goes about home town freely
		X-XI
C	78.	Writes occasional short letters
C	79.	Makes telephone calls
O	80.	Does small remunerative work
C	81.	Answers ads; purchases by mail
		XI-XII
O	82.	Does simple creative work
S D	83.	Is left to care for self or others
C	84.	Enjoys books, newspapers, magazines

Vineland social maturity scale* (Cont):

Categories†	Items	
		XII-XV
S	85.	Plays difficult games
S H D	86.	Exercises complete care of dress
S D	87.	Buys own clothing accessories
S	88.	Engages in adolescent group activities
O	89.	Performs responsible routine chores
		XV-XVIII
C	90.	Communicates by letter
C	91.	Follows current events
L	92.	Goes to nearby places alone
S D	93.	Goes out unsupervised daytime
S D	94.	Has own spending money
S D	95.	Buys all own clothing
		XVIII-XX
L	96.	Goes to distant points alone
S D	97.	Looks after own health
O	98.	Has a job or continues schooling
S D	99.	Goes out nights unrestricted
S D	100.	Controls own major expenditures
S D	101.	Assumes personal responsibility
		XX-XXV
S D	102.	Uses money providently
S	103.	Assumes responsibilities beyond own needs
S	104.	Contributes to social welfare
S D	105.	Provides for future.
		XXV+
O	106.	Performs skilled work
O	107.	Engages in beneficial recreation
O	108.	Systematizes own work
S	109.	Inspires confidence
S	110.	Promotes civic progress
O	111.	Supervises occupational pursuits
S D	112.	Purchases for others
O	113.	Directs or manages affairs of others
O	114.	Performs expert or professional work
S	115.	Shares community responsibility
O	116.	Creates own opportunities
S	117.	Advances general welfare

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O—occupation
C—communication
L—locomotion
S—socialization

Institutional factors in socialization

Introduction. As Korzybski has pointed out, in discussing the errors of linguistic splitting, identification, and structural differential, it is easily possible to divide by language that which is not divisible in actual material organization.[22] Thus, one approaches a discussion of such a topic as "institutional" factors in socialization with hesitation. It is virtually necessary to discuss institutions as systematic categories of stimuli as though they existed separately, but the continuous interaction of the individual with his environment, both social and personal, must be borne in mind.

There are two classes of relationships among men. One is what we might term the man-to-man or person-to-person relationship on a unit basis. The other type of relationship is the contact that the individual has with the institutions that society has built up over a long period of time. It is not possible to go into minute detail about the effect of these social institutions upon the individual. The momentous question, for example, of whether or not society is best served by the complete subjugation of the individual to the purposes of the state cannot even be touched. The discussion will be limited to an enumeration of certain crucial social institutions with a brief comment upon the significance of each in the social functioning of the individual.

The home. The home is referred to by many sociologists as a unit. The home derives its force in the life of the individual from one salient psychological fact—namely, the determinative weight of early associations and conditionings in later conduct. Watson and many others have noted the potency of early conditioning and that long before the child reaches school age his native tendencies are heavily overlaid with a superstructure of conditioned reactions.[23] It is too frequently the sad duty of the school to attempt to change some of these early conditionings that are socially ineffective, but before this can be done the teachers and administrators must be acquainted with and understand the social environment of the child. In spite of numerous assaults by the modernists of various schools, the home continues to be a seemingly indispensable primary unit in society, and there is no convincing evidence of any likelihood of change in spite of a number of factors that are operating to alter and in some cases to diminish the influence of the home.[24]

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[22] Korzybski, *op. cit., passim.*

[23] J. B. Watson, *Psychology from the Standpoint of a Behaviorist* (Philadelphia: J. B. Lippincott Company, 1919).

The church. Like the home, the church has long been regarded as a primary social institution. Larger than the home in its circle of members, and exerting its influence at a later time, the church and religion play a dominant part in the determination of the direction of social functioning of the individual. Religion is also of dominant influence in the determination of social attitudes, a topic which will be considered presently.

Government. Beginning with the home and continuing through schools, churches, and other institutions, society in every time and place has set up a definite mechanism for making its standards and laws known to the individual. In addition, social groups customarily establish a systematic machinery whereby standards are conserved and the interests of the group maintained. Government is the name given to the social organization that performs this function. Governments vary from the loosely organized groups of primitive societies up to the vast and complex machinery by which a country like the United States of America is governed. Government is a tremendously potent factor in the determination of the conduct lines of the individual. The United States at the present time witnesses a clash of opinion of almost diametrically opposed points of view on this identical question. One group contends that hitherto untrammeled spheres of personal autonomy are in serious jeopardy.[25] Another group holds for the desirability of government regulation over a considerable number of personal affairs, not for the purpose of stifling or dominating the individual, but for the purpose of protecting rights in jeopardy by other social institutions. One of the most difficult parts of the social functioning of many individuals is their inability to adjust effectively to various phases of government.

Personal property. Modern society, as we know it, is organized on the assumption that each individual in that society may possess an aggregation of material that is peculiarly and particularly his own.

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[24] F. F. Powers, *Character Training* (New York: A. S. Barnes & Co., 1932), p. 15.

[25] J. T. Flynn, *The Road Ahead, America's Creeping Revolution* (New York: Devin-Adair Company, 1949).

In discussing the development of property rights, Guthrie and Powers state:

> Early family experience establishes a complex of behaviors centering around the use of possessive pronouns: *mine, yours, his, hers.* The early tendency of children to seize and manipulate the large variety of objects in the neighborhood and the inborn tendency for the grasping response to be intensified when an object is pulled away are the beginnings of property rights.
>
> Property rights are first established in children toward the personal belongings of their family and associates. The extension of habits of respect toward public property comes only with later training. Even the defense of ownership will be found to depend on individual experience and so to vary from child to child.[26]

Transgressions and violations of property rights of others are tolerated in children for a considerable length of time. The same transgressions and violations are treated with considerable severity when they occur in adults. One of the country's most notorious felons has alleged, perhaps defensively but at least interestingly, that his own long list of larcenies was the direct result of careless training by his parents and teachers on the meaning of personal property and the sentiment with which its violation is regarded.

Language. Language, in many ways, is the most fundamental of institutions. It is so regarded by Judd, who has devoted much attention to both individual growth and institutional growth.[27] The basis of the fundamental importance of language is social functioning. Suppose, for example, that language and the communicative arts were to be blotted out on the instant. Social functioning, both of individuals and groups, would be temporarily at a standstill and impaired permanently. From the strictly personal standpoint, and from the standpoint of the psychology of individual development through social functioning, the relationship between mental growth and language elaboration has long been recognized and is noted by many writers. Although many authorities do not care to go as far as Watson,[28] all are agreed on the vital place of language in the mental development of all individuals.

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[26] E. R. Guthrie and F. F. Powers, *Educational Psychology* (New York: The Ronald Press Company, 1950), p. 363.

[27] C. H. Judd, *Psychology of Social Institutions* (New York: The Macmillan Company, 1926), p. 187.

[28] Watson, *op. cit.*

Number. Another institution by which society has advanced itself tremendously is the institution of number. Early man, although possessing vague quantitative perceptions, with equally vague methods of expressing them, did not have an elaborated numerative system. One of the priceless acquisitions of the centuries has been the progressive refinement of the system of enumeration. Consequently, few people can function successfully in modern society unless they have a reasonable acquaintance with the science of number.[29]

Education. As a social institution that determines the growth of the individual, education is second to none. It is the agency that society has set up to allow the child a period of experimental social functioning and growth. It is the duty of education to preserve rather faithfully the social heritage, and for this reason it must always be somewhat conservative. Hightower, in discussing the school's responsibility to transmit the national culture, asserts:

> Assuredly, education should not assume the responsibility for directing and rebuilding every part of the social order. It should form a partnership with other institutions within society. But it is my firm belief that education should take the lead. And we may take the lead by focusing our attention on the points common to all people in the culture. I do not assume that it is the school's responsibility to directly build a new social order, but I do assume that it is the job of education to build the kind of persons who will continuously remake society in the light of the needs of all mankind.[30]

In order to undergo the correct educative growth that is to result in effective later social functioning, the child should receive from education three vital phases of training. These are:

1. *The mastery of certain facts.* The facts here referred to are not the sole or unique possession of any single group. They are the heritage of all mankind and, although differing in form in various times and places, are universal in their basic significance. The science of number, as expressed in the multiplication table, is an instance in point. Universally accepted physical law is another example.
2. *The mores of the group.* In addition to training in basic universally accepted factual knowledge, the child is entitled to an early induction into the mores of the particular group to which he belongs. Criminals often say, and without the appearance of excuse-making, that their

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[29] Judd, *op. cit.*, p. 77.

[30] H. W. Hightower, "The School—Its Social Role," *Progressive Education* XXV (Jan., 1948), 18.

early errors were not so much deliberate choices of wrong as ignorance. Juvenile courts bear out their contention. Of course, in numerous instances the individual knows perfectly well the custom of the community and the penalty for its violation. But this does not always hold true. The least we can do for the child is to let him know what is expected of him. His violation of the standard will then be deliberate choice.

3. *Social techniques.* The child not only needs to know certain facts and the customs of the community in which he is likely to live, but also should possess a technique of adjustment. Everyone envies the cosmopolite who fits easily and naturally in a wide variety of social situations. This is largely the result of experience. There is no better place to give the child such experience than in the school. School is a sort of society in which errors may be made with a minimum penalty. Social techniques should include not only practice in adjusting oneself to groups of one's fellows but also encouragement to develop a program of self-improvement in social functioning.

According to Olsen:

> Ever more clearly it becomes apparent that school education must be projected out of the sheltered classroom and into the living community which is the child's primary scene of the present and future life activity. For education is inherently a social process, and if it is to be realistic, vital, and therefore defensible in the modern democratic world, its curricular program must be framed in terms of continuous, first-hand acquaintance with significant aspects of the physical, biological, and social environment.[31]

Physical factors in socialization

Hereditary physiological factors. One of the most persistent theses of modern psychology and education is the emphasis upon conduct as determined by factors other than what used to be called "free will." These factors, acting in varying proportions and at different times, are the innate physiological setup of the individual and the nature of stimulus patterns to which he is exposed. In this discussion of hereditary physiological factors, three phases are to be considered:

1. *Physique and character.* We all know that our growth and social functioning are influenced by physiological factors. Even though we admit that the glands are subject to conditioning and that emotional control is partly a matter of habit, it still is likely that some people have

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[31] E. G. Olsen, *School and Community* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1945), p. 12.

the kind of glands originally that cause them to get angry and to exhibit other emotion more easily and quickly than other people. No one would deny that fits of anger and rage are a detriment to social growth and functioning. There is the possibility, then, that a relationship exists between certain types of physique and certain kinds of character.

2. *Physique and social attitudes.* Attention will be given presently to the detailed consideration of the genesis and importance of social attitudes as phases of social growth. Our interest at this point is simply to note that our own conduct is determined often by the attitudes of others toward us, as expressed by words or other conduct. But the attitude of others, in turn, is influenced by factors of physique, some within and some without our control. After an investigation of the role of physical ability in the socialization of adolescent boys, Jones concluded that, "The boy who is slightly deficient in physical traits may experience, in relation to his own aspirations, a slight handicap in social relations in his age group."[32] Handsome or beautiful people and ugly people have problems which are characteristically different. Sheer physique produces types of attitude which, in turn, require decisions and the adoption of definite lines of action. It is probable that there are characteristic differences in the social growth of beautiful girls and ugly girls. On the same analogy, there are thousands of other similar examples.

3. *Innate likes.* Murphy and Murphy have pointed out that there are many primary likes and dislikes.[33] One example that they give is that people natively like sugar and dislike quinine. They cite also color preference as an instance of an innate like. Sociality is regarded by them as at least partially innate.

Innate likes and capacities constitute part of the basis for social growth. It is natural for an individual to attempt to secure or bring about a condition for which he has a natural liking. When society interferes with this quest, conflict results and social growth is either interrupted or changed in direction.

Physical environment. In these days of considerable urbanization, much attention has been given to the effects of certain special types of environment, such as population congestion, upon social behavior. Studies have shown that there is a lower incidence of juvenile delinquency in the areas contiguous to play fields than in other parts of congested areas. Brown reports delinquency is more prevalent in areas that are declining and where family life is not stable.[34]

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[32] H. E. Jones, "Physical Ability as a Factor in Social Adjustment in Adolescence," *Journal of Educational Research*, XL (Dec., 1946), 300.

[33] G. Murphy and L. B. Murphy, *Experimental Social Psychology* (New York: Harper & Brothers, 1931), p. 83.

[34] F. J. Brown, *Educational Sociology* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1947), p. 349. Rate map on p. 350.

One of the experimental factors that is deemed significant is poverty. Plant lists poverty as one of the conditions that invite delinquency. He says:

> *Poverty.* The psychiatrist is very sure that well-advantaged children have quite as many frustrations as their poorer cousins. However, two important factors tend to keep the former from being 'delinquents.' Better-advantaged children have many ways to carry out their aggressions without sticking their elbows into society's ribs. Camp life, a place to run and play, this or that gadget that invites manipulation—these socially acceptable outlets tend to cut down the amount of delinquency in this group. And if his frustrations become too much for him and his reactions become stronger than his immediate environment can stand, the child of the higher economic group can be sent to private school or given other 'advantages' which obviate the need for intervention from the attendance officer, the forces of law and order, the court.[35]

The effects of conditions such as poverty cannot be corrected by a single person or group of persons, but require concerted mass action.

Class status. Late surveys of social structure in the various sections of the United States have shown not only the existence of class differentiation but also the influence of these social classifications upon the behavior of individuals. In discussing these findings Warner, Meeker, and Eells say:

> Recent scientific studies of social class in the several regions of the United States demonstrate that it is a major determinant of individual decisions and social action; that every major area of American life is directly and indirectly influenced by our class order; and that the major decisions of most individuals are partly controlled by it. To act intelligently and know consciously how this basic factor in American life affects us and our society it is essential and necessary that we have an explicit understanding of what our class order is, how it works, and what it does to the lives and personalities who live in it. Our democratic institutions, including our schools, churches, business organizations, government, and even our family life are molded by its all-pervading and exceedingly subtle but powerful influence.[36]

As factors in the socialization of the child, class status and its implications must be understood by both teachers and administrators. It is impossible to teach effectively unless one is acquainted with the way in which the pupil thinks, feels, and expresses his thoughts and emotions. In order to understand pupil behavior the teacher must first understand his cultural environment, which is largely determined by the class status of his parents.

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[35] National Society for the Study of Education, *Juvenile Delinquency and the Schools*, Forty-seventh Yearbook, Part I (Chicago: University of Chicago Press, 1948), p. 26. Used by permission of the Society.

[36] W. L. Warner, M. Meeker, and K. E. Eells, "Social Status in Education," *Phi Delta Kappan*, XXX (Dec., 1948), 114.

It is of paramount importance that teachers realize the differences in social backgrounds between themselves and their pupils and between individual pupils. Every effort must be made to find out as much as possible about the home and social life of the child so that a meeting ground for thoughts and actions between the teacher and the pupils may be discovered. Marburg suggests the use of diaries and themes on open questions as two means of learning more about the social environment of school children.[37]

The role of class status in adjustment is illustrated in the results of an investigation by Heintz. In a study of the junior-high-school pupils of Rochester, Minnesota, he found that class status was "... a small but persistent influence in adjustment. But other factors closely associated with it, such as intelligence, education of parents, economic resources, and the possession of status objects tended to re-enforce it."[38] According to this study, class status was a greater influence in pupil adjustment in the areas of curriculum, relations with the administration, social life of girls, and the evaluation and enforcement of rules than in any other phases of school activity. In discussing the relationship between class status and adjustment, Kuhlen and Lee point out that an acceptable social status is necessary for a satisfactory social and personal adjustment.[39]

Normal and abnormal social functioning

Introduction. How may one know if his social growth and character formation are developing normally or otherwise? By what standards can he judge these things in another? These are questions of practical everyday concern, since people are continually passing upon the normality or abnormality of their own actions and the actions of others. It must be recognized first of all that "normality" is strictly a *relative* term. True enough, certain groups, particularly theologians, hold that some conduct is absolutely right and some is absolutely wrong. But even this apparent absolutism is relative, because it is judged by comparison with the actions of others. It would be the gravest of errors to assume that every kind of conduct is normal. Particularly from the practical angle, this is a disastrous assumption. For even though normality *is* a matter of definition and agreement among people as to what they will accept as normal or otherwise, it must be carefully borne in mind that such definitions have been widely given, agreed upon, and accepted, and transgressors are punished accordingly.

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[37] F. W. Marburg, "Studying the Child's Social World," *Journal of Educational Sociology*, XXI (May, 1948), 535-543.

[38] E. Heintz, "Adjustment Problems of Class Status," *Phi Delta Kappan*, XXX (Apr., 1949), 290-293.

[39] R. G. Kuhlen and B. J. Lee, "Personality Characteristics and Social Acceptability in Adolescence," *Journal of Educational Psychology*, XXXIV (Sept., 1943), 321-340.

Categories of normal social conduct. The first category of normal social functioning and growth which we shall consider is the *legal.*[40] Legal normality is normality by definition. It is a standard that the individual's social growth does not always enable him to attain. Often an individual fails to achieve legal normality because, not believing in the standards laid down, he purposely dissents. The sort of training that one has had in his early schooling makes a great deal of difference in the extent to which he is likely to be a dissenter. Radicals, iconoclasts, anarchists, and such, like Catholics, Protestants, Mohammedans, and so forth, very often have had parents of similar leanings. Not only from the standpoint of sound logic, but also from the standpoint of the practical impossibility of changing society overnight, it is reasonable for the schools to teach intelligent conformity with legal standards.

A second criterion of normal social functioning is the *ethical.* The ethical and the legal may or may not coincide. A person may be legally wrong and ethically right, or vice versa. Ethical standards are not usually voted upon directly or indirectly, as are laws. The statement is more often made through a religious agency. In the long run, ethical standards are likely to be a greater stabilizing agency than the legal.

The third criterion of normality is the *statistical.* It is most often stated in terms of the majority. The ethics of the situation may or may not be on the side of the majority. Statistical normality may be transitory, but it is no less potent than some other kinds. Although more individual divergence is allowed in some types of conduct than in others, the majority of people determine the standard. The costly religious wars of the past were fought because of the efforts of the majority to enforce upon a minority "normality" in this serious affair.

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[40] For a fully elaborated discussion of categories of normality, see Uhl's discussion in Powers and Uhl, *op. cit.*, chap. 12.

The fourth criterion of normal social functioning is the *psychological*. The psychological criterion is related somewhat to the statistical. A note of warning on this point is sounded by LaPiere and Farnsworth, who state:

> It is important, however, that we realize that there are many, perhaps innumerable, manifestations of mental abnormality, that an individual may be psychopathic in one regard and reasonably normal in all others, and that an individual may be mentally normal at one time and psychopathic at another. Finally, we should realize that there are infinite graduations of abnormality. All this means that it is impossible to say that one man is entirely sane or that another is entirely psychopathic.[41]

A person is normal if he is acting as other people act. The psychotic who replied, when asked why he was in the asylum, "There are more people like you than me," was not entirely wrong. The psychological criterion also has to do with a person's opinion of his own action. Of course, if he is entirely self-sufficient, he thinks that everything he does is correct and that is the end of it. Normal social functioning is most assured, however, when the individual, although believing in his own line of conduct, sets it thoughtfully against the other standards that have been mentioned.

Social attitudes

As a person functions in social situations, one of the things that he develops is a collection of attitudes toward individuals, groups of individuals, and institutions. Attitudes are important because they are closely allied to action, and, like the wish, the attitude is often father to the deed. There is one outstanding point to be made in connection with attitudes, and this is that practically all experimental work points to their early formation. According to Anderson:

> The environment determines attitudes and ideals, and prejudice and emotional bias as well. The similarity between the attitudes of children and the attitudes of parents is surprising. It is particularly marked in

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[41] From *Social Psychology*, 3rd ed., by LaPiere and Farnsworth. Copyright, 1949. Courtesy of McGraw-Hill Book Co.

> religion, social taboos, manners, and politics and is less marked in those attitudes that are most affected by the influence of contemporaries and associates, such as styles of dress and slang. There is, for instance, a high correlation between the fears of the mother and the fears shown by the young child. Some children live in an atmosphere of confidence and courage, some in an atmosphere of fear and inadequacy. Children of a particular group pick up some attitudes very early, both from their parents and from the comments made by associates in their presence. The attitudes of children toward other races vary widely in different sections of the country. In one environment a child may fear thunder and lightning and think of it as God speaking to him; in another he may look upon it as a natural phenomenon. Thirty years ago children were much interested in fairy stories, but children's librarians now report that this interest is declining. To the modern child the magic carpet is not quite so interesting as the airplane which flies overhead.[42]

Here again, emphasis is thrown heavily upon pre-education and lower-grade education. As a matter of fact, a child really learns his psychology, not from a university professor, but from a kindergarten teacher. An article by Rosander brings this point out clearly. He says:

> It appears from this study that the measurable changes in attitude due to college instruction are slight, that in the majority of cases there is no appreciable change, and that the personal beliefs of the professor may not be such a dominant factor as we have been led to believe. The writer's opinion is that the effect of the usual course in government on the attitudes of students has been grossly exaggerated. The mastery of a large mass of facts about the Constitution does not mean that a person thus equipped will be more critical, or more objective, or more wise in his attitude toward this document.[43]

Investigations by the writer upon the relation between intelligence, personality traits, and superstition point to the fact that high intelligence does not seem to be a protective factor against superstitious beliefs.[44] The reason for this is probably that a person acquires many of his superstitions at an early age when even high intelligence is inadequate to cope with the lower intelligence of a superstitious adult who transmits the false belief. Thus, improvement in attitudes is impeded by the propagation in the social heritage of erroneous interpretations of natural phenomena. The burden, then, of developing favorable social attitudes is upon parents and teachers.

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[42] J. E. Anderson, *The Psychology of Development and Personal Adjustment* (New York: Henry Holt & Company, Inc., 1949), p. 321.

[43] A. C. Rosander, "A Quantitative Study of Social Attitudes," *School Review*, VIII (Oct., 1935), 614-620.

[44] F. F. Powers, "The Influence of Intelligence and Personality Traits upon False Beliefs," *Journal of Social Psychology*, II (Nov., 1931), 490-493.

Social roles

One of the most important factors in socialization is the development of social roles. Roles are built up as a result of group needs and a person is quickly typed as to the roles he is to play. The more consistent he is in assuming the characteristics of his chosen roles the more likely he is to be accepted by the group. Culture defines how the roles are to be played and society is constructed around the tendency of individuals to accept them. Each role is only a part of the total social pattern and without the background of society the role does not function. Sorokin asserts:

> Without an entire drama there can be no role; for a role is possible only in the context of all the roles of drama. Whatever an isolated individual may do, none of his actions constitutes a social phenomenon or its simplest unit. A role can become a social role only in the presence of the social matrix.[45]

Teachers should recognize the value of role-playing in the learning situation. All children tend to play roles: each child has many roles that he assumes when in contact with different people. The teacher may consider Jim a problem since he is always interrupting her lessons with personal questions, his mother may think of him as her baby boy who can do no wrong, whereas his age-mates may know him as the best pitcher on the sandlot team. So complex is the social order that each person has many roles and each of these roles is different from the other; yet at the same time he must conform to the patterns of society that are applicable to all men. Gillin believes that:

> American society expects the individual to be many things to many men, but, in spite of the numerous positions and parts he is expected to take in adult life, he is also expected to conform to a rather vaguely defined type known as the generalized American personality.[46]

It must be remembered that the actions of a child may be only the manifestations of the role he is playing at that time. To understand his actions fully, they must be separated from his personality. One must determine what role he is playing superficially as well as overtly. The behavior of the individual will be more easily interpreted if one is able to see beyond his overt role.

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[45] P. A. Sorokin, *Society, Culture, and Personality: Their Structure and Dynamics* (New York: Harper & Brothers, 1947), pp. 39-40.

[46] Kluckhohn and Murray, *op. cit.*, p. 169.

One of the main values of role in socialization is the opportunity it affords for a child to understand his own role, the role played by others, and the relationship of the two. In assuming a role, a child must fit into a pattern made up of many roles. To portray adequately his role he must understand its relative position among various other roles. The ability to accept personal roles and to understand the contribution of them and other roles is the stabilizer of society.

Character education

Recent years have seen a tremendous emphasis upon character education. In fact, the demand for useful experimental work, which could be incorporated into school programs, has outstripped even the efforts of such assiduous investigators as Hartshorne and May.[47] It is no accident that emphasis upon character education in both home and school parallels the rise in interest in the social subjects. This increase in attention to the social subjects naturally arises as the result of a period of social and economic stress. It is clear that no process of socialization can be complete, no matter how detailed the study of social institutions, as found particularly in the older social studies, without the crystallization of socially adjustive habits in the individual, and this we have defined as character.

McKown, whose *Character Education* is one of the most comprehensive and practical treatises on the subject to date, emphasizes throughout the importance of utilizing the several school subjects in developing character.[48] This emphasis is entirely logical, since, if we accept the definition of character as consistent conduct trends, then, if the school subjects, representing, as they do, training in a wide variety of fields, do not contribute to this objective, any other effort is likely to prove fruitless.

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[47] H. Hartshorne and M. A. May, *Studies in Deceit* (New York: The Macmillan Company, 1928); and *Studies in the Organization of Character* (New York: The Macmillan Company, 1930).

[48] H. C. McKown, *Character Education* (New York: McGraw-Hill Book Company, Inc., 1935).

The schools and character education. Next to the home, the school is the most influential agent in the formation of character, and people expect it to take an active part in character development. Havighurst and Taba note that:

> The importance of character is so generally understood and accepted that character is ranked by most people as of first importance in the child's education. In a recent national poll [published by the National Opinion Research Center, University of Denver, in June, 1944], 34 per cent of the persons interviewed said that character education was the most important aspect of education, a proportion just equal to those who placed the mastery of the three R's in first place. Among people who have a college education, 51 per cent gave character education first place.[49]

The Educational Policies Commission stresses the need for character education in its report on the education of gifted children. In pointing this out they write, "Able and educated leaders who lack character are dangerous, for they use their abilities for selfish or antisocial ends."[50] Character education is necessary, however, at all levels of mental ability.

Because of the complex nature of our modern society the school has been forced to assume more and more of the duties formerly performed by the home. Character education has become increasingly significant as an integral part of the curriculum due to the additional responsibility placed upon the school in this area. In order for the schools to fulfill their obligations, a coordinated program of character development is necessary throughout each system; each staff member must participate in both the formation and execution of the policies if the program is to be successful. The adage, "No chain is stronger than its weakest link," is an unequivocal truth in the field of character education.

There is no magic formula for use in the development of character. The number and complexity of the facets inherent in the problem make it impossible for any axiom to be applicable in all situations. However, there are certain principles that school personnel will find useful as guides. In a discussion of this fact Smith says:

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[49] R. J. Havighurst and H. Taba, *Adolescent Character and Personality* (New York: John Wiley & Sons, Inc., 1949), p. 3.

[50] Educational Policies Commission, *Education of the Gifted* (Washington, D.C.: National Education Association of the United States and the American Association of School Administrators, 1950), p. 9.

Naturally, the work in character development must be chosen and prepared according to grade and age levels. There are, however, certain patterns of influence and effort that run continuously through all public-school age levels. The following are examples:

a. The general school environment and atmosphere.
b. The influence of administrators and teachers.
c. The use of the regular curriculum.
d. Orientation, guidance, and adjustment efforts.
e. Appeals (either to groups or to individuals) to reason and common sense.
f. Student participation in class, school, or school and community affairs.
g. Habit-forming experiences in class, in the school building, or on the playground.
h. Planned and incidental emphasis on character traits, ideals, and moral principles.[51]

Juvenile delinquency and social adjustment

Families, churches, schools, and other institutions direct continuous effort toward character development and social adjustment, but sharp rises in youthful crime and juvenile delinquency continue to be reported annually. The crime and delinquency statistics shock parents, teachers, and all concerned with youth and with society. Legislators, law enforcement officials, social workers, educators, and other lay and professional workers are deeply concerned in the fields of both corrrection and prevention. What knowledge can we bring to bear on the problem of juvenile delinquency?

First of all, what is "juvenile delinquency"? The term is not easily defined. Clinical definitions are concerned with aspects of personality and adjustment, whereas legal definitions are concerned with behavioral infractions of defined statutory nature, differing from state to state. Juvenile delinquency is sometimes defined as the violation of a law that, if committed by an adult, would be a crime. States, however, differ in their definition of "juvenile" and frequently expand the definition of "delinquency" to permit the juvenile court to extend services of protection, help, and guidance to children with certain atypical patterns of behavior that, although not in violation of criminal law, make it impossible for parents to exercise control and protection. Strictly speaking, a juvenile offender is not "delinquent," whatever his behavior, until he has been judged so by the courts. The fact that many cases of "first offenders" and victims of maladjustment are handled by agencies other than the court further clouds the status of the antisocial behavior of children and youth. Comparable cases are handled variously in differing places and times. Although "juvenile delinquency" is not altogether synonymous with "junior crime," statistics reflect those cases that have been classified as "delinquent" by the court. The Federal Bureau of Investigation reports that youths under eighteen accounted for 47 per cent of major-crime arrests in 1957 and for 53 per cent of arrests for robbery, burglary, breaking and entering, larceny, and automobile theft.[52] These figures are more shocking when one considers the numerous cases of social maladjustment which have not reached the level of juvenile crime.

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[51] H. L. Smith, "Program for Character Education," *Phi Delta Kappan*, XXXI (Jan., 1950), 248.

Although, in earlier times, juvenile misconduct, as all crime, has been looked upon as "natural," today the cause of behavior is sought in the dynamics of human personality and the environment that stimulates a given response. Aggressive and hostile behavior is usually symptomatic of failure to adjust to an environment that has been demanding, particularly if the individual is unable to meet these demands. When aggressively hostile behavior in a child or youth becomes a matter of concern because it is habitual and destructive or threatening, one seeks clues in the feelings and experiences of the child. Any one of a variety of circumstances may be evident: (1) rejection by a parent, giving rise to a feeling that "nobody cares"; (2) conflict or unpredictability and change in the family relationships, supplying a basis for feelings of insecurity; (3) failure to achieve in school, with a resultant lowering of self-esteem, which activates a need to achieve in another area; (4) lack of opportunity for wholesome satisfaction of the need for adventure and excitement; (5) economic difficulties that cannot be evaluated in absolute terms but which must be examined in the context of family status and community pressures; (6) vicious and immoral home conditions, a deteriorated neighborhood, or lack of appropriate standards of behavior; (7) a succession of personal crises that have induced a state of continuous and heightened anxiety; (8) the opportunity to identify with a gang having questionable standards but considerable peer prestige; (9) a neurotic or psychopathic personality with certain characteristic patterns of behavior.

Except in the case of the casual offender who may "go along" on some prankish escapade or be caught on an occasion when he was persuaded against his better judgment, conviction for delinquency is usually for an act that arises from a pattern of behavior that has been developing over a period of time in response to tensions and anxieties. Because it is difficult to assess feelings with complete objectivity and because outcomes are only superficially related to those data that are easily stated objectively, one cannot always arrive at underlying relationships by studying record forms. As one might expect, however, the pre-delinquent pattern of behavior is often characterized by truancy, which may be thought of as symbolic of the rejection of adult authority. An accelerated frequency of absenteeism may well characterize increasing maladjustment through inability to accept the restrictions and limitations of school routine. It is apparent that truancy or dropping out of school may not be a "cause" of delinquency but that the school counselor or teacher should be alerted by the evidences of maladjustment characterized either by withdrawal or aggression.

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[52] Federal Bureau of Investigation, U. S. Department of Justice, *Uniform Crime Reports for the United States*, XXVIII, No. 2 (Annual Bulletin, 1957) (Washington, D. C.: U. S. Government Printing Office, 1958).

The observant teacher who notes the conduct of children and keeps anecdotal records will detect evidences of anxiety and aggression or withdrawal and lack of motivation while there is still time for corrective measures. Opportunities to succeed in either curricular or extracurricular activities may provide the needed boost to self-esteem that will ease the pressures to find that satisfaction elsewhere or in other ways. Ingenuity is required in necessary modifications of the curriculum, adjustments of program, or cultivation of social climate to effect the desired result. The teacher may need to offer a more challenging and rewarding program for some; for others, playing the role of a sympathetic adult whom the child can trust may do the job. The teacher, however, cannot expect to solve all problems, however great his insight and motivation to help boys and girls, but must know when and how to seek help by referral to the principal, school nurse, counselor, or curriculum consultant. Help for disturbed children must be planned cooperatively. When feasible, parents and the child himself must share in the development of understandings, standards, and goals and in the appraisal of progress. In the cases of seriously disturbed children, the aid of the school's social, psychological, or psychiatric services will be sought, and school agencies may cooperate with community agencies in trying to work out the best possible program. Teachers, however, must recognize the limitations of the authority of outside agencies and schools and respect the autonomy of the family.

Realistic teachers accept their own authoritarian limitations and the fact that there are some extraschool situations about which they can do little. Knowing when and how to help, without complicating the child's problem of adjustment beyond his power to succeed, is an empathic art.

Frequently recreation programs are proposed as panaceas for "juvenile delinquency." Such proposals may be viewed somewhat skeptically, since they do not deal directly with the underlying problems of adjustment. Organized recreation does, however, provide opportunities for children to succeed in areas outside school and home, to experience adventure under supervision, and to occupy a portion of the time outside of school and home constructively. As with the school program, much of the success of the supervised recreation program depends on the imagination, skill, and awareness of the recreation worker. It also depends on the ability to identify children needing help, and willingness to give personal attention to those who need it. The recreation program that is conceived as part of a total program for community improvement in which many adults share responsibility can attack some of the environmental aspects of the problem of juvenile delinquency. Deep-seated problems of basic motivation and personal adjustment are seldom completely resolved, however, by manipulations of the environment.

Overt, hostile behavior of the intensity that is likely to be judged "delinquent" is actually directed at solving a problem, although the relation of the response to the problem may not be apparent. Counseling services provided by the community help the youth to identify the problem, to develop understanding of the relation of his behavior to the problem, and to explore possible solutions other than the aggressive attempts that succeed only in creating new problems. But expert counseling procedure is time-consuming and expensive and not likely to be successful unless the child can accept the challenge and participate in the process with some hope of success. If a child has feelings of guilt about his behavior and early family training has built a sense of personal responsibility, there may be a better prognosis for success than in the absence of these conditions. When the values of a boy or girl differ markedly from those of the family and community, the process of solution may be slow and difficult.

Likewise, with discipline and punishment, the effectiveness depends largely on personal values and standards. For this reason, citizenship training and education for social responsibility begin with the earliest school years. The child has learned much about how to adjust to social living before he comes to school, but there is much more also to learn. When children understand and accept the values and standards of their culture and government, discipline is more apt to be effective in keeping behavior under control——discipline that relates the punishment to the offense and to the underlying reasons for insisting on conformity to social mores. Punishment, likewise, for the delinquent, should be more than a "get tough" policy; it should utilize all that is known and available in the way of services to rehabilitate the delinquent to constructive participation in society. Unduly permissive acceptance of behavior that deviates from social standards may actually deter the child's progress toward social adjustment as a mature adult willing to accept reasonable limitations on conduct in order that all members of society may enjoy more productive life.

Summary

The main points of this chapter may be summarized under the following headings:

1. Education is a many-sided process in which social growth and character formation are basic.
2. Socialization is partly a "native" and partly a learned series of responses.
3. Habit plays an important part in both socialization and character formation as in all learning.
4. The definition of social growth is in terms of progressive improvement in conduct, which, in the case of character formation, emphasizes the element of consistency.
5. Socialization is not, because of its complexity, a simple learning product.
6. Many behavior patterns of the young child, which are not actually antisocial, at least require definite redirection before the individual may be regarded as socialized. Two of the major types of change required are the change from comparative egoism to comparative altruism, and the ability to respond in specific ways to stimulation.
7. Much infant behavior is random, diffuse, undifferentiated, noncentralized, transitory, and immediate. This condition makes children's conduct seem especially remote from that of the socially mature adult.
8. The problem of levels of social adjustment is a perplexing one but has been attacked by the technique of Doll, who has laid down definite conduct criteria for all social maturity levels from birth to maturity.

9. Socialization is in no small sense comprised of the nature of one's adjustment to those definitely organized groups of individuals and customs known as institutions.

10. Some of the institutions that are effective in significant ways in the socialization of the individual are the church, government, personal property, language, number, and education.

11. In order to perform its function in the socializing of its charges, education must give to them as a basic minimum (a) the mastery of certain facts, (b) the knowledge of the mores of the group, and (c) social techniques.

12. It is probable that a relationship exists between certain types of physique and certain types of temperamental organization. In any case, mere physique occasions the social attitude toward the individual, which in turn results in certain attitudes of the individual toward society.

13. Social class status is an important factor in socialization.

14. Normal social conduct is a relative term and may be judged from several angles. Some of these are the legal, the ethical, the statistical, and the psychological.

15. Present educational philosophy and practice regard social attitudes as valuable and necessary objectives of the educative process.

16. Each individual plays many roles. One of the child's first tasks is to recognize the responsibilities and contributions of his basic roles.

17. The school is being forced to assume more and more responsibility for character education because of the increasingly complex nature of society.

QUESTIONS AND EXERCISES

for discussion and study

1 Is social growth an isolated development? Why?

2 What part does habit play in social functioning?

3 Define social growth and character and explain your definition.

4 What is meant by the expression that the child is a "dynamic unity"?

5 Mention three social dangers of the prolonged period of human infancy.

6 Why is it important that teachers be acquainted with the characteristics of infant behavior?

7 Distinguish between conduct levels and intra-level stages. Give examples of each.

8 State four possible ways of testing social development.

9 What are the institutions that deeply affect the social development of the individual, and how does each produce its effect?

10 Discuss the role of class status in the socializing process.

11 Summarize the discussion of physical factors in socialization.

12 What are the several angles from which conduct may be judged as normal or abnormal?

13 Evaluate the school as an agency for character education.

14 What deficiencies of social development contribute to the delinquency of youth?

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CHAPTER 12

Development of attitudes, interests, and values

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EDUCATION FUNCTIONS in an atmosphere largely determined by the attitudes, interests, and values of pupils, teachers, administrators, parents, and school board members. The "set" of the child determines his receptivity within this atmosphere, whereas the teacher and others, with their particular biases, determine the material and procedures of the educative process. The basic purpose of this process is to influence the development of an individual to produce personal qualities of physical, social, intellectual, and emotional readiness to meet a complex array of life situations. Whenever teachers attempt to influence the development of children, they encounter numerous conditions. Some of the states that already exist in children inhibit the intended response, whereas other predispositions have a positive and reinforcing effect. It is the emergence and development of these predisposing purposive elements of the organism known as attitudes, interests, and values with which we are concerned in this chapter.

A discussion of attitudes, interests, and values must begin with a realization that they are dynamic phenomena that interact with all other elements of the organism rather than the static units that they may seem to be when they are discussed. In their earliest form, and throughout most of the period of infancy, they are a part of the vague, undifferentiated mass known as the affective state of the child. Although integration and interaction continue as development progresses in the organism, some of the materials that make up this mass can be identified. Certain behavioral characteristics are noticed as life experiences are encountered, and from these it is inferred that the individual has a particular attitude, interest, or value.

Attitudes

What are attitudes? Attitudes have been defined as ideas with emotional content, important beliefs, prejudices, biases, predispositions, appreciations, and as states of readiness or set. Allport [1] has defined an attitude as a "mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects with which it is related." Attitudes have intellectual, biological, social, and emotional components that are derived from experience and exercise a determining influence upon behavior. Any definition that includes all of the connotative aspects implied by the term *attitude* must be broad and vague, yet it is necessary somehow to limit this discussion to a specific concept. For this purpose an attitude is defined as a developmental state of organismic valence, created by psycho-biological processes, exerting a motivational influence upon the individual's responsive behavior in situations directly and indirectly related to it.

A variety of patterns are included in an individual's array of attitudes. There are attitudes toward health, life, death, people, new situations, music and art, work, play, government, religion, and many more that are of like importance. These attitudes have been influenced by the educative process through planned and random experiences. Since creating and shaping attitudes is one of the most important functions of the school, attention should be given to a study of their genesis, nature, and dynamic aspects.

Emergence and early development of attitudes. In their most primitive form attitudes exist as simple pleasant or unpleasant states of the infant. Some of these feelings are results of satisfied or unsatisfied biological needs. Others are produced by pleasurable or unpleasurable responses from mother, father, or siblings. Whenever an infant eats, excretes, sleeps, cries, and moves about it is interacting with its surroundings, both animate and inanimate. This interaction produces sensory stimulation and feeling-tones of a general nature. As growth and development occur in the infant a changing array of needs brings new reactions to objects and situations. An infant gains pleasure from being helped and protected, whereas a child in the early period of walking is likely to resent and reject the helping hand. Taking in food through the mouth, sucking, and other receptive oral activities provide obvious pleasure for the infant, but the child who is teething finds the mouth a source of pain and discomfort. Developmental changes of this kind produce tremendous changes in the child's relationships with objects and situations.

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[1] G. W. Allport, "Attitudes," in C. Murchison (ed.), *Handbook of Social Psychology* (Worcester, Mass.: Clark University Press, 1935), p. 810.

Despite apparent incongruity the orderly and sequential development of the total organism results in threads of continuity of feeling. Ordinarily a satisfying state of affairs over an extended period of time produces a positive feeling in the child for the object or activity involved. As the child's perceptual field expands, some generalization of response becomes possible. An infant who has experienced general pleasure at the breast or bottle is likely to anticipate pleasure from eating other foods. Continued dissatisfaction and unpleasantness during nursing are likely to create a negative feeling about eating. Eating problems are frequently found in young children who have experienced disagreeable or unsatisfying feeding of significant duration or intensity during infancy. As the psychological life of the child becomes more complex and some of its needs directly oppose others, feelings are not so simply related to external situations. This is illustrated in the very young child who learns that attention can be gained more readily from mother and father by doing something that is forbidden and to which they respond with displeasure. A continuing need for attention that is stronger than the need for a pleasurable response from the parent reinforces the child's undesirable behavior. Youngsters who want to be punished because of their feelings toward their parents may seek unpleasant responses from them.

A child's attitude toward authority figures is obviously an important element of socialization and determines much of his behavior in school. Early experiences involving the child and his parents are responsible for the beginnings of this attitude. A rebellious attitude toward authority figures (teacher, principal, leader, and others) may spring from a conflict with someone in authority, usually a parent or parent substitute. Itkin,[2] in a study involving 400 students and their parents, found a very significant relationship (one per cent level) between both male and female students' attitudes toward the father figure and the father's acceptance-rejection of the child. This relationship was not the result of dominance or laxity of the parent but simply the kind of feeling between father and child. Another important element in the early development of a child's attitude toward adults is the satisfaction or dissatisfaction derived from the child's dependency upon parents, particularly the mother figure. Spitz,[3] and Ribble,[4] have contributed significantly to this subject. Their findings seem to be well expressed by Roudinesco [5] in the remark that "any separation from the family, and especially from the mother, is for a young child a painful and distressing experience which is not tolerable before he has acquired the concepts of time and space. Such an experience in children under three years of age usually brings a change in their relationship with adults." Separation over a period of time accompanied by deprivation of needs is likely to produce an incapacity to achieve close and intimate human relationships. Koch,[6] in her study of 384 children five and six years of age, found that the child's attitude toward the teacher was strongly influenced by the following elements of the mother-child relationship:

1. satisfying experiences with mother,
2. mother's experiences and what she expected of the child,
3. mother's attitudes toward other children in the family.

Other attitudes of children have their origins in the family relationships in the home. A detailed study of parent-child relationships was conducted by Baldwin and others [7] at the Fels Institute. Several syndromes of parent attitudes toward children were discovered and explored. The parental attitude of "acceptant-democratic" seemed to facilitate growth and development more than the others. Children from this home atmosphere of warmth and equality had an accelerated intellectual development, were more original, indicated more emotional security and control, and were less excitable than children from other homes. In school these children were popular, friendly, and non-aggressive leaders. A later report by Lasko [8] supports these findings and points out that warmth, democracy, and indulgence seem to typify three types of home environment encountered in her study. Of these the democratic atmosphere was most important in accounting for the observed variations in behavior. Evidence from these studies suggests that the parents' acceptance of the child and the autonomy that the child experiences in daily contacts in the home are strong determiners of later behavior in a school situation.

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[2] W. Itkin, "Relationships Between Attitudes Toward Parents and Parent Attitudes Toward Children," *Journal of Genetic Psychology*, LXXXVI (1955), 339-352.

[3] R. A. Spitz, "The Psychogenic Diseases in Infancy: An Attempt at Their Etiologic Classification," *Psychoanalytic Study of the Child*, VI (1951), 255-275.

[4] M. A. Ribble, "Infantile Experience in Relation to Personality Development," in J. M. Hunt (ed.), *Personality and the Behavior Disorders*, II (New York: The Ronald Press Company, 1944), pp. 621-651.

[5] J. Roudinesco, "Severe Maternal Deprivation and Personality Development in Early Childhood," *Understanding the Child*, XXI (1952), 104.

[6] H. L. Koch, "The Relation of Certain Family Constellation Characteristics and the Attitudes of Children Toward Adults," *Child Development*, XXVI (1955), 13-40.

[7] A. L. Baldwin, J. Kalhorn, and F. H. Breese, "Patterns of Parent Behavior," *Psychological Monographs*, LVIII, No. 268 (1945), 1-75. See also A. L. Baldwin,

Certainly the other members of a family constellation play an important role in shaping early attitudes of the child. Such factors as the child's place in the chronological order of the family and the sex of siblings have been explored as possible determiners of attitudes. Koch [9] found significant relationships between these factors and certain attitudes in her study of 384 five- and six-year old children from two-child families. More signs of stimulation or stress were noted among members of opposite-sexed pairs of siblings than among like-sexed pairs. When an age difference of two to four years existed between these opposite-sexed pairs, they were found to be "more self-confident, more cheerful, active, healthy, less vacillating, and more inclined to recover poise readily than the children whose sib was like them in sex." This study indicated that age spacing is more closely associated with such things as confidence, emotional intensity, excitability, moodiness, anger, decisiveness, alibiing, projecting of blame, and indirection. Differences in attitudes were not significantly related to simple sex differences.

Attitudes developed during the preschool years are associated with the general culture in which the child is reared as well as the direct influences of family relationships. Playmates, neighbors, members of other culture groups, physical surroundings, economic condition of the

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"The Effects of Home Environment on Nursery School Behavior," *Child Development*, XX (1949), 49-61.

[8] J. K. Lasko, "Parent-child Relationships: Report from the Fels Research Institute," *American Journal of Orthopsychiatry*, XXII (1952), 300-304.

[9] H. L. Koch, "Some Emotional Attitudes of the Young Child in Relation Characteristics of His Siblings," *Child Development*, XXVII (1956), 393-426.

family, and various other factors influence the child directly and indirectly. These factors place a limit upon the child's experiences and establish the nature of the environment. Day-to-day experiences and the child's perception of them have a strong influence in establishing the pattern of feelings developed in the child about objects, activities, and situations. A study of the responses of 4,360 pupils to a questionnaire led Sister Mary Charleen [10] to feel that children bring to school preconceived opinions about racial matters, religious differences, and economic status. Her data indicate that teachers must be prepared to receive these different attitudes as early as kindergarten and first grade. Direct experiences were responsible for many of these attitudes, but a strong factor in their development must have been the indirect influence from older persons such as parents and siblings. Allport [11] points out that, in addition to the reactions to direct experiences, attitudes are taken into the child through the processes of identification and introjection. A child is likely to internalize the attitudes of people whom he desires to be like or to please. It is also likely that the attitudes of persons whom the child dislikes will be rejected along with them.

This discussion has brought us to that period in a child's life when the school becomes a very important factor in shaping existing attitudes and creating new ones. Teachers and others who attempt to fulfill this important role of dealer-in-attitudes should be acquainted with their dimensions as well as their development.

Dimensions of an attitude. Attitudes have four dimensions: intensity, direction, extensity, and duration. Each of these aspects is important in understanding attitudes and their influence upon behavior. Assessment of these characteristics is done most frequently by observations of behavior, but attempts have been made to develop tests to evaluate attitudes. Behavior patterns provide evidence of each of these dimensions, whereas most tests simply attempt to survey the attitudinal pattern and determine their positive or negative direction.

Intensity of an attitude is evidenced by the extent to which it motivates an individual's behavior. Limits of intensity can be determined by the nature of the barriers needed to inhibit a response. Behavior motivated by a weak attitude can be thwarted by obstacles that seem to have very little actual resistance, but an intense attitude is likely to find expression in behavior despite almost overwhelming obstacles.

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[10] Sister Mary Charleen, "Diagnosing the Causes of Prejudice in School Children," *National Catholic Education Association Bulletin* (1950), 453-456.

[11] Allport, *op. cit.*

An observer must be aware that an attitude can be expressed in several ways, and that if it is intense there is likely to be a shift in mode of expression when severe obstacles are confronted. A child with an intensely negative attitude toward authority figures may be deterred from direct aggression toward them but may write dirty remarks in public places, destroy property, and act out these feelings indirectly.

The direction of an attitude is observed in behavior as a force that repels, attracts, or fails to motivate the child in any direction, as in the case of an "I don't particularly care" attitude. Although behavior in a given direction frequently indicates a directly related attitude, there are numerous occasions when the opposite interpretation is in order. An individual having a negative attitude toward a given group may join them, outwardly seeming to have a positive attitude but by very subtle means bring about disruption and chaos in the group or divert it from its goal.

Extensity is observed in a broad survey of the patterns of attitudes within the individual. Some attitudes seem to have broad and pervading influences. These probably develop from a wide variety of situations that have reinforced feelings until generalizations have occurred. A single potent incident of a sort that can be generalized may bring about an extensive influence. Other attitudes seem to be unique or at most related to only a small segment of behavior. Actions that are uncommon in a particular child may provide evidence of this type of limited attitude.

The duration of an attitude is another aspect that is important to educators. A function of education is the modification of existing negative attitudes and the creation of new ones that are positive and enduring. Attitudes may endure for only a short time because they have not been reinforced by experiences. In fact, new experiences may bring about a complete reversal of a previous attitude. In general, it can be said that an attitude endures as long as it promotes the goal objectives of the individual. It is evident that attitudes are modified through experience. They may be changed from strongly negative to positive, strongly positive to negative, or shades of change may occur between these extremes. Since attitudes are subject to change it is important to look at the methods that have been found effective and ineffective in producing change.

Modification of attitudes. Attitudes are changed by school experiences. They may be changed by the influence of a particular teacher, another child, the peer group, a single event, curricular material, a series of extracurricular events, or any combination of these elements. Not all changes are in the desired direction. Schools not only attempt to solve problems but frequently present them, without intending to do so. There are several inconsistencies that are presented to the child during the educative process. Children are taught to be cooperative and at the same time placed in competition with each other. They are taught that it is good to achieve success, and yet they may be given material beyond their capacity to achieve. Children are told they should like school, but school to them may mean very little because they do not feel involved in it. The child may even be placed in a situation about which parents have voiced strong negative attitudes, forcing the child to make an important decision on the spot. Life is filled with inconsistencies, but educators should not allow children to develop attitudes at random from those problems that school life presents. Deliberate effort should be given to providing experiences that are likely to aid in the development of desirable attitudes. No doubt most of the attitudes developed during school hours are desirable and lasting. The big question at this point is, "What can be accomplished in changing attitudes when deliberate efforts are made?"

As early as nursery school and kindergarten, children have been provided with certain experiences designed to modify attitudes. At this age children are expected to be egocentric and willing to give very little of their time and energy to group activities. A primary aim of the teacher is the development of a socio-centric or group feeling. Reporting on the method and results of psychodrama with nursery and kindergarten children, Lippitt and Clancy[12] remarked that after a period of time the children ". . . were using energies, efforts and creative powers to be constructive and spontaneous instead of destructive and disruptive." Their findings indicate that role-playing of this kind can improve rapport between children and adults, assist in readiness for new and unexpected experiences, improve social skills, provide insights, and increase understanding. Using role-playing over a three-year period with children in the primary grades, Nichols[13] found that there were the following effects:

1. Interest in subject matter is increased.
2. There is an increase in children's awareness of feelings.

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[12] R. Lippitt and C. Clancy, "Psychodrama in the Kindergarten and Nursery School," *Group Psychotherapy*, VII (1954), 262-290.

[13] H. Nichols, "Role-playing in Primary Grades," *Group Psychotherapy*, VII (1954), 238-241.

3. Children increase in their ability to project themselves into other personalities such as are encountered in reading materials.
4. Reading materials become more meaningful to children.
5. Oral language is improved and vocabulary increases.
6. The teacher's enthusiasm and perception of child needs are likely to increase.

Close and extended contacts between children and teachers made possible in school-camping may provide opportunities for observing attitude changes. Mussen,[14] studying the effects of such experiences upon the racial attitudes of white boys, found that intimate contact *per se* did not insure a decrease in prejudice. Changing attitudes that have a high emotional component is likely to call for a more emotional technique than is involved in simple contact. Sister Mary Ita[15] expresses the idea that strongly emotional attempts succeed better than calm appeals to reason because prejudices have a strong emotional component.

A permissive classroom atmosphere that promotes free expression and discussion has been proposed as a means for changing attitudes in the classroom. Metcalf[16] discusses free emotional expression as it is effective in dealing with attitudes if they are distinguished from beliefs. Beliefs are viewed as opinions regarding the nature of reality and should be subject to change through the acquisition of new knowledge. Attitudes are considered to be free from claims regarding the nature of reality and made up solely of feelings and emotions. Feelings have been found subject to change through expression that promotes catharsis and insight. The result of free expression depends upon the extent to which feelings can be clarified for the individual who expresses them. Insight occurs and feelings change when they are understood and accepted. Elliott and Moustakas [17] have been concerned with the mechanics of creating the atmosphere for free expression. and they describe such a situation in details that cannot be covered in the limits of this discussion.

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[14] P. H. Mussen, "Some Personality and Social Factors Related to Changes in Children's Attitudes Toward Negroes," *Journal of Abnormal and Social Psychology*, XLV (1950), 432-441.

[15] Sister Mary Ita. "Diagnosing Causes of Prejudices of Children in School," *National Catholic Education Association Bulletin* (1950), 441-444.

[16] L. E. Metcalf, "Attitudes and Beliefs as Materials of Instruction," *Progressive Education*, XXVII (1950), 127-129.

[17] P. Elliott and C. E. Moustakas, "Free Emotional Expression in the Classroom," *Progressive Education*, XXVIII (1951), 125-128.

Evidence relating to the curriculum as a means of changing student attitudes is discouraging. Lagey[18] concluded that there were no noticeable direct relationships between the content of courses in the curriculum and attitude modification. Attitudes toward criminals and other concepts of a relatively weak emotional flavor were subject to change through regular teaching techniques, but attitudes toward religion and race resisted change. Ojemann[19] presents the idea that textbooks and teaching materials do not help in changing attitudes because they do not come to grips with social problems by presenting causes. A discussion listed in a social science textbook under the title "Juvenile Crime" is likely to cover the subject by discussing frequencies, types of offenses, the law enforcement policies, and other types of noncausally oriented material. Such a superficial and academic approach is neither interesting nor effective. A classroom discussion of causes is more likely to be of value to pupils in developing attitudes. Changes may not become evident in a short period of time. Mahdesian[20] tried group discussion with pupils in grades one through six and found it ineffective over a short term. The greatest difficulty confronting those who want to determine attitude changes is in finding a means of measurement sensitive enough to detect changes over a short period. When longer time intervals are used the number of intervening experiences decreases the significance of the technique being studied.

Students making trips abroad have been tested before and after the trip to determine the effects of their experiences upon attitudes. Smith[21] found that attitudes directly related with the experience changed significantly. General attitudes such as world-mindedness, ethnocentrism, authoritarianism, conservatism, and attitude toward democratic group-processes did not change during the four to six months interval. A knowledge of the individual's pre-existing attitudes seemed to be important in assessing the outcome of their experiences. This idea is reinforced by the findings of Spigle,[22] who studied the effects of educational movies on the attitudes of high-school boys. Pre-existing attitudes tend to be reinforced by experience when there are no direct attempts at interpretation and control.

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[18] J. C. Lagey, "Does Teaching Change Students' Attitudes?" *Journal of Educational Research,* L (1956), 307-311.

[19] R. H. Ojemann, "Changing Attitudes in the Classroom," *Children,* III (1956), 130-134.

[20] Z. M. Mahdesian, *An Experiment in Group Discussion As It Affects Pupil Attitudes in an Elementary School,* Unpublished Doctoral Dissertation, New York University, 1955.

[21] H. P. Smith, "Do Intercultural Experiences Affect Attitudes?" *Journal of Abnormal and Social Psychology,* LI (1955), 469-477.

Although reports of attempts to change pupil attitudes are meager, only a few of the real efforts are reported. Influenced changes occur every day, but they may not be evidenced in immediate behavior. It takes an accumulation of knowledge, several pleasant experiences, and many evidences of the values attached to certain attitudes by others to bring about a reorientation of goals and aspirations. Most attitude changes occur in this way, but teachers could be more successful by making sure that the school provides pupils many occasions for desirable attitudes to develop. School is a place for living as well as a place for preparing to live in the future. Everyday school living determines the accumulation of preparation for the future, and we should be concerned with attitudes that prevent the school from having its proper influence upon children.

New experiences in the classroom are approached from a different direction by each pupil. The anticipatory aspect of these approaches is so important that it predetermines what the occurrence will mean to the child. It may mean continued failure, a thrilling new success, an uncolorful whim of the teacher, or any of a number of other possibilities. Since the school has goals that have determined the selection of this particular adventure, it is vital to explore each child's anticipation of it. Frequent chances for pupils to express their feelings give evidence of changes as they occur and help to prevent emotions from inhibiting the learning process.

In early life children are enthusiastic in new learning situations, but somewhere along the way many of them lose this enthusiasm and become school-haters. This seems to be a problem faced by every teacher. How can children be kept enthusiastic? *Keeping the learning process close to the learner* is a principle that comes nearest to answering this question. A desirable attitude toward learning will be maintained if (1) the thing to be learned is not too far removed from past learnings; (2) the learning situation is made physically and intellectually attractive to the learner; (3) the knowledge or skill to be acquired is perceived as a need satisfier; (4) concomitant experiences do not appear to be more immediate goal satisfiers; and (5) learning is accompanied by a feeling of achievement reinforced by recognition from others. When these conditions are sustained for all learners, teachers will no longer be troubled by children who have negative attitudes toward school.

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[22] I. S. Spigle, *The Cumulative Effects of Selected Educational Motion Pictures on the Attitudes of High School Boys and the Relationship of Attitude Changes to Selected Personality and Intellectual Factors*, Unpublished Doctoral Dissertation, Indiana University, 1955.

Attitudes as appreciations. Appreciation is a special type of attitude set apart because it is in the realm of esthetic experience. Like other attitudes it is goal-oriented and a functional part of one's self-concept. In essence, appreciation is the understanding and love of beauty in any of its various forms. The mode by which beauty is experienced is perception that is determined by a variety of biological, psychological, and cultural influences that vary in number, strength, and quality among individuals. What is beautiful, and what is not, is a function of these conditions. The concept of beauty has been juggled, in the fashion of the hen and the egg, between those who see beauty inherent in reality and others who feel that it exists only in the perceiver. Whatever the viewpoint, it is certain that some common qualities are inherent in objects and creations that large numbers of people perceive as beautiful. Trow[23] outlines the following qualities of esthetic structure: (1) order; (2) balance; (3) sequence and rythm; (4) transition and emphasis; (5) contrast and texture; and (6) unity. A creation of nature or art may possess each of these structural qualities and be unappreciated because of insensitivity of its viewer or listener. Readiness to accept stimulation of this kind is the result of numerous experiences that have shown the individual that certain stimuli produce a satisfying state of affairs, and this is an aspect of sensitivity. But biological characteristics also have an influence upon sensitivity by limiting the threshold of awareness. Tone deafness and visual defects such as color blindness, astigmatism, hyperopia, and myopia predetermine perceptual sensitivity and influence appreciation. Cultural biases also have a place in determining readiness of people to perceive certain aspects of structure. Rhythm is such a potent element in the music of some cultural groups that tonal qualities are not of vital concern, and within a general culture there are smaller groups characterized by their sensitivity to qualities that are discordant to others.

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[23] W. C. Trow, *Educational Psychology* (2nd ed., Boston: Houghton Mifflin Company, 1950), pp. 646-652.

An aim of education is to help pupils to sense and love beauty whenever it is encountered. This aim is implemented in the curriculum by courses in music and art, and in the extracurricular program pupils are given opportunities to enjoy music, dancing, painting, and other forms of esthetic experience in an atmosphere of friendly association and warmth. Children learn appreciations when they perceive themselves as part of the experience. This feeling may be brought about by knowledge, skill, understanding, or simply a spine-tingling sensation created by some unknown associations. Whatever the mode of receptivity, appreciations can be learned, and the teacher who is sensitive to beauty in nature or art is likely to influence development of appreciation in others. The natural result of appreciation is expression in one form or another. An enjoyable experience is heightened when it is shared. Through subtle teaching, comments, and facial and body movements, teachers share their esthetic experiences with their pupils. Thorough expression of the teacher's appreciation is likely to permeate the group and produce lasting effects.

Interests

What are interests? Writers have defined interests as preoccupations, objectives, likes and dislikes, and motives. William James[24] discussed interest as a form of selective awareness or attention that produces meaning out of the mass of one's experiences. In describing the nature of interests, Berdie[25] viewed them as factors that attract an individual to or repel him from objects, persons, and activities. The operational or experimental approach most frequently used in the assessment of interests involves a study of the individual's likes and dislikes. Strong[26] speaks of interests as "likes" and labels "dislikes" as "aversions." When interests are plotted as patterns or profiles they are located on a scale ranging from a non-interest or zero point to a high positive value. From the operational viewpoint it is sufficient to look upon interests as organismic conditions that result in a desire for further stimulation from a particular type of object, idea, or experience. Although this definition omits the negative or dislike aspect of interest, there is no intent to disregard its importance in behavior. These aspects of interests probably should be discussed as negative or antagonistic attitudes rather than as negative interests.

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[24] W. James, *The Principles of Psychology*, Vol. I (New York: Henry Holt & Company, Inc., 1890), p. 402.

[25] R. F. Berdie, "Interests," in P. L. Harriman (ed.), *Encyclopedia of Psychology* (New York: Philosophical Library, 1946), p. 305.

[26] E. K. Strong, *Vocational Interests of Men and Women* (Stanford, Cal.: Stanford University Press, 1943), p. 6.

With interest defined as an organismic condition, it becomes important to explore its formation. How do interests emerge? What influences are important in their development?

Emergence and development of interests. Evidences of interest in the form of attention can be observed in the early behavior of infants. Stimulation produced by a light, a sound, or a touch causes awareness evidenced by movement of the body and fixation of the eyes. Infants have a need for sensory stimulation and seek to be stimulated by being alert to their surroundings. Pleasure seems to be derived from simply watching the movements of people and objects. At first this activity is primarily biological, but as perceptions occur and concepts begin to form, the psychological component becomes more important. The child learns to avoid those activities perceived as unsatisfying and to repeat those that have proved to be worthwhile. Inherited physical characteristics or those brought about by environmental influences have a place in determining which objects and situations prove satisfying to the child. This point is illustrated in the child with defective vision or hearing whose perception is inhibited by these handicaps. Confusion of images or sounds is very likely to produce anxiety in the child, thus influencing the development of interest in certain objects and activities. Out of the total of early childhood experiences a pattern emerges in the form of sought-after objects and situations. Ordinarily these are the experiences that can be successfully dealt with by the child at a particular developmental level.

Exploratory activities consume most of the free play time of children during the first two or three years of life. They have a natural desire to explore the objects they encounter. They touch them, bite or suck them, shake them and inspect their exteriors as well as any prominent irregularities in their form. Objects of particular interest to the young child are those that reflect light or move about. Examination of of these elements of their environment may keep the child occupied for increasing periods of time. During this stage of development concepts are formed through differentiation, and as language develops a name is given to the concept. An intense interest in reality objects and their relationships is likely to continue until the child has become quite familiar with the surroundings. Of course. severe frustrations cause a loss of this natural interest. Adults may fail to encourage the child by withholding attention, approval, and help when these are needed, or a severe physical handicap may limit the child's activities.

Overlapping with the continuing interest in objects is a growing awareness of the people who inhabit the child's universe. Attention to the activities of adults and mimicry of them begins to be interesting to the child. In addition, an increase is noted in the child's awareness of his own body movements and sounds. As body control improves the child is likely to be interested in exhibiting this control in contortions, running, jumping, dancing, singing, and otherwise performing for others.

As an outgrowth of an increase in knowledge of reality and relationships, the child begins to manipulate these in fantasy. An interest in fantasy is natural and is likely to continue for some time in the highly imaginative child and in the child who lacks successful real-life experiences. This interest in fantasy frees the child from boundaries of reality and allows him an opportunity to explore the possible relationships and ideas stimulated by the host of concepts that have partially developed. Fantasy also provides an opportunity for the child to find a place for the ideas that are not easily attached to some reality object with which he is familiar. Although the child may have had noticeable success in manipulating objects and persons within his surroundings, these successes are more limited than the child desires. In the freedom of imaginative play he can conduct these manipulative experiences and feel successful in it. Learning occurs through the role-playing that goes on in the fantasy life because through expression new relationships are explored.

Along with the interest in objects. relations. and fantasy. the child has an increasing delight in activities that involve movement. Bott[27] in her study of play interests of children in nursery school discovered that children were interested in locomotor toys at all ages from two to five years. but their interest was highest at ages three to four years. This interest in movement seems to increase with age for boys and to show a decline for girls.

When a child has reached the age of five or six years and has entered kindergarten or first grade, a rather evident sex role has been adopted. Studies of children indicate that this sex role strongly influences the child's likes and dislikes. Tyler[28] studied 115 children in this age range and found four kinds of interests: (1) active play outdoors, (2) playing with toys indoors, (3) paper-and-pencil activities, and (4) helping adults with work. Significant differences were noted between the kinds of activities selected by boys and girls. In commenting upon this situation Tyler points out that, since sex differences are among the earliest to become evident to children, it is expected that their choices might be related to these differences. The matter of appropriateness of activities for sex roles grows more evident in elementary-school years. In a later study, Tyler[29] explored the interests of boys and girls in the fourth grade. She found a more definite repudiation of things that were thought to be characteristic of the opposite sex. Boys rejected inappropriate activities, things associated with being a sissy, and girls' work. Girls rejected physical activities, aggression, and all sorts of things deemed out of order for girls. Results of her studies have caused Tyler to suggest that interest patterns result from the development of dislikes by those who have an originally favorable attitude toward everything. Although it is possible that interests do develop in this way, conclusive evidence must await longitudinal studies involving many children over a period of several years.

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[27] H. Bott. "Observation of Play Activities in a Nursery School." *Genetic Psychology Monographs,* IV (1928), 75.

Children's general interests are sometimes explored by providing an opportunity for them to express their spontaneous wishes. In a study of children's wishes conducted in the kindergarten and elementary schools of Evanston, Illinois, each child was asked to express three wishes.[30] Responses were interpreted as important interests of the child. Studies of this nature have resulted in the conclusion that children's interests reveal a preoccupation with objective thoughts and an orientation toward receiving material objects because wishes tend to be organized around wants of a material nature.

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[28] L. E. Tyler, "The Relationship of Interests to Abilities and Reputation among First-grade Children," *Educational and Psychological Measurement*, XI (1951), 255-264.

[29] L. E. Tyler, "The Development of Vocational Interests: The Organization of Likes and Dislikes in Ten-year-old Children," *Journal of Genetic Psychology*, LXXXVI (1955), 33-44.

[30] P. A. Witty and D. Kopel, *Reading and the Educative Process* (Boston: Ginn and Company, 1939). See also A. T. Jersild, F. V. Markey, and C. H. Jersild, *Children's Fears, Dreams, Wishes, Daydreams, Likes, Dislikes, Pleasant and Unpleasant Memories* (Child Development Monographs, No. 12 [New York: Bureau of Publications, Teachers College, Columbia University, 1933]).

Children's expressed interests change as they grow older and have opportunities to experience an ever-expanding range of activities. Chronological age has been the most frequently used index for studying and reporting interests, but there is some evidence that maturity may be a more reliable index. Kaufman's[31] study of 2,234 children in grades four through eight in the elementary schools of Waukegan, Illinois, revealed interesting results in this direction. When a maturity index was applied there was more homogeneity of groups than when chronological age was the controlled factor. With maturity index as the determiner of groups, neither socio-economic status nor race had much effect upon the interests of each level. Several other significant results were observed:

1. Interest became higher for organized games as children grew older.
2. Biological concerns were found to be strong in the age group.
3. Boys' interests turned to the professional, service, and technical occupations, whereas girls were interested in office and entertainment services.
4. Curricular interests of boys indicated growing preference for science and mathematics, whereas girls turned to the language arts and social studies.
5. Both sexes indicated increasing interest in heterosexual group experiences.
6. Boys had the strongest interest in gang activities from 10-12 years. Girls' gang interests were strongest at 12 and 13 years.

One of the most extensive and significant studies of children's interests has been reported by Jersild and Tasch.[32] Their exploratory survey involved over 3,000 children in grades one through twelve in many communities in various parts of the country. Results of this survey support many of the observations already discussed in this chapter, but they will bear repetition. Only a portion of the findings are reported in the following points:

1. At all ages children are much preoccupied with people and their interpersonal relationships.

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[31] M. M. Kaufman, *Expressed Interests of Children in Relation to a Maturity-Age Index in Grades Four through Eight*, Unpublished Doctoral Dissertation, Northwestern University, 1955.

[32] A. T. Jersild and R. J. Tasch, *Children's Interests and What they Suggest for Education* (New York: Bureau of Publications, Teachers College, Columbia University, 1949).

2. Children tend to relate their interests and references to the world at large to their own self-concepts.
3. Children, especially in early grades, place great importance upon receiving gifts.
4. Differences in interest exist between children from different schools and classes, suggesting influence by teachers.
5. Children's interests are the result of learning opportunities.
6. As children increase in age they become more interested in forms of self-improvement, such as vocation and education, self-understanding, and the understanding of others.
7. Children generally, but more frequently in junior and senior high school, tend to view their goals as different from those of the school and fail to see how school will promote their personal goals.
8. There is a general decrease of interest in school as the child grows older.
9. Social studies are viewed unfavorably more often than favorably.
10. Expressed interests are not related to actual needs of the child.
11. Activities outside of school most disliked are chores and everyday work.

Results of the studies that have been reported indicate several important aspects for consideration in the classroom. Interests seem to develop out of satisfying activities, and they tend to stimulate further activity. Learning is derived from these same experiences and is directly influenced by the enthusiasm a child has for the process. It has been said for years that a compelling interest can compensate for the absence of several IQ points. Research has not revealed the extent of this influence but observation of learners supports the idea. Several questions may be raised at this point. What is the role of the school in dealing with children's interests? Can interests be changed in the classroom? How?

Interests and the curriculum. School curricula of today are replete with materials that furnish numerous possibilities for interest to develop. The curriculum of a modern elementary or high school contains samples of so many life-situations that it is difficult to imagine a child who could not find several interesting elements in it. In general, children do show interest as they learn, yet there are many who leave school each day with comments such as, "Ah, that old stuff, I don't like it." Why do children feel this way? How can interest be stimulated in the classroom?

A teacher should know the interests of each pupil early in the school year. Instruction should begin at the point of interest of the child, and this cannot be accomplished unless these interests are known. Tests of interest are limited in their value for instructional purposes because they tend to be vocationally oriented and not sufficiently specific for use with elementary-school pupils. However, such techniques as interview, parent conferences, telling-time, and reports to classmates on special projects can offer useful knowledge for the teacher. Assessment of some kind should be carried on frequently to keep up with the changing interests of youngsters. Certainly it is important to know these interests prior to presenting a new unit of subject matter. Existing interests can be used as channels for presentation of new learnings, since they are familiar territory to the learner. It is not enough merely to channel learning into this single interest, but efforts should be made to broaden the child's interest pattern to include new avenues.

Children are interested in things that stir them or in some way tease their sensory system. Other things equal, teachers should employ an optimum of sensory stimulation in a learning situation. Often this will call for an escape from the four walls of the classroom to find actual life examples of the material to be mastered. When this is not possible or advisable, reality should be brought into the classroom. This is not always possible, as in the case of a study of the geography of the Nile Valley; however, pictures, models, aerial plots, and other concrete materials can be made a part of the presentation. If the learner helps to provide these objects he will give a part of himself to the process and become more interested in it.

Children are interested when someone around them has an expressed interest. Teachers, thus, must be interested if their pupils are to become interested. Not all teachers, however, can be enthusiastic in every aspect of the curriculum. This is one reason for the departmental approach to teaching, and yet circumstances sometimes force those who lack interest in a subject to teach it. This is unfortunate for both teacher and learner. It has been said that a portion of the lack of pupil interest in science and mathematics is the result of the large numbers of female teachers in elementary schools. This generality presupposes that female teachers lack interest in these subjects, which may or may not be true. Persons forced to teach subjects that are not interesting to them should set about developing an interest, or they should change positions for the welfare of their pupils.

How long do interests last? Some are fleeting, whereas others may abide for a lifetime. Ginzberg [33] and others recognize three levels of interest development roughly related to chronological age. Before the age of eleven interests tend to be transitory and unstable, between eleven and seventeen they begin to crystallize and might be termed "tentative," whereas after seventeen they become stable and realistic. These stages concern vocational choices and may not be satisfactory for all types of interest patterns. Although a specific interest may fade, there is a tendency for its replacement to be in the same general field or in a related activity. Maturity brings economic and social responsibilities that combine to limit changes in interest except in situations resulting from tremendous social upheavals, such as those that follow world conflicts. The G. I. Bill provided an opportunity for large numbers of men and women to realize an interest change following World War II and the Korean War. Interests change with opportunity when (1) they are no longer consistent with the self-concept; (2) they do not lead to a desired goal; and (3) they lead to dissatisfaction.

Vocational interests. Boys and girls begin to show concern about possible vocational choices and goals when they reach adolescence. Earlier unrealistic and impulsive aims give way to aspirations more directly related to their past experiences. Making a vocational choice is a difficult problem for young people whose work opportunities have been limited to chores at home, working in stores, helping in service stations, and other kinds of unskilled labor. Their knowledge of the work world is gained through unsystematic reading, observation, being around business establishments, and other kinds of haphazard opportunities to learn. From their meager knowledge and work experience, they are expected to make choices out of the multitude of jobs and career plans available in a complex society. Vocational interests of the student depend upon knowledge, attitudes, values, physical characteristics, and environmental influences. Lack of awareness of personal characteristics, meager knowledge, and limited experience combine to produce a confused interest configuration for many boys and girls. The school has a responsibility to assist students with their vocational problems in several ways, but our primary concern here is with the matter of interests. What can school life provide that will help crystallize vocational interests?

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[33] E. Ginzberg, J. W. Ginzberg, S. Axelrod, and J. L. Herma, *Occupational Choice* (New York: Columbia University Press, 1951).

The use of occupational information in the classroom provides students with facts that broaden their visions of the world of work. Information about occupations can be imparted in a variety of forms as an integral part of each study unit in any phase of education:

1. Vocational literature can be supplied as required or suggested reading material.
2. The teacher can point out vocational aspects of the subject matter that is being considered.
3. Representatives of vocations related to the specific study unit can be invited to discuss their work.
4. Field trips offer opportunities for observation of people as they work at various jobs.
5. Movies and filmstrips showing the application of skills and knowledge can be valuable parts of the instructional program and provide concrete evidences of school-job relationships.

Knowledge of occupations is only one of the requirements for realistic vocational interests. Students must have a clear impression of themselves if their interests are to be related to potential achievements. The concept of self is developed through all of an individual's interactions with his environment, and it may be unduly influenced by any single experience or series of observations. Adequacy of the individual student's knowledge of himself in terms of a broad array of functions determines whether or not interests and aspirations are realistic and can be achieved. This discussion cannot explore all of the methods that might be used to aid in the development of self-concepts, but the following suggestions are offered:

1. Whenever it is possible without harming the individual pupil, self-concepts can become a part of classroom discussion material.
2. Courses in social and family living afford many chances for the pupil to view himself in relation to others.
3. Physical and health education classes help students to know more about their strengths and weaknesses and teach them ways of compensating for weaknesses and using strengths more effectively.
4. Teacher-pupil conferences conducted with the pupil as the central figure bring out ideas and facts that help in concept development.
5. Wise and frequent use of the guidance services of the school through referrals and use of test results by teachers and pupils will promote concepts of self for the pupil.

These are but a few of many techniques that may be used effectively in helping students to know more about themselves, a natural outgrowth of pupil-centered education.

Values

What are values? Values are unique verbal concepts that relate to the worth given to specific kinds of objects, acts, and conditions by individuals and groups. At least three dimensions can be found for values: (1) a quantitative element, which indicates the amount of worth one allocates to the particular phenomenon; (2) a quality of elasticity, which is evidenced by the extent to which a person holds to his ideals; and (3) the interrelationship or system frequently referred to as the individual's *heirarchy of values.* As social concepts, values are involved in the educative process because they are basic to the society of which the child and the school are parts.

In this discussion of social concepts, we are concerned with the nature of their development, the school's function in value-formation, and finally, a consideration of the values that should be included in the school curriculum.

Development of values. How do persons come to place a particular evaluation upon an object, act, or condition? Some values are derivatives of the natural developmental process and cannot be traced to specific elements or events that have occurred along the way. A multitude of satisfying and unsatisfying experiences, observations of the results of behavior, learnings about the effects of the activities of others, knowledge of the human organism and its animate and inanimate surroundings, and the adoption of concepts deemed worthwhile by others, all contribute to the formation of values. Satisfying and unsatisfying experiences cause children to allocate varying amounts of energy to seeking one type of objects or conditions and avoiding others. Some reinforcement is given to personal experiences by observations of the results of the behavior of others. Knowledge of the relationships that exist within and between the individual and his environment makes up the material for the reasoning process, and reasoning has a place in value-formation because it allows the child to arrive at conclusions and predictions concerning the results of a particular action. Through introjection there is internalization of the things held dear by someone with whom the child identifies himself. These persons are usually close, warm, and friendly or have a position that is desired by the child. Through identification with such a person the child indicates hope of arriving at a status similar to that of the model or ideal. *Daddy thinks it's important to go to school. I like Daddy and want to resemble him, so I think it's important to go to school, too.*

This brings us to the consideration of a process that results in the development of *pseudo-values.* Children learn that if they are to gain primary goals they must go through rituals imposed upon them by their parents and society at large. These learnings produce a pattern of conformity that may be misinterpreted as a system of personal values. The following brief case history illustrates this point:

> Bobby grew up in a home where his parents were consistently rigid and authoritarian. Evidence of warmth and affection was lacking in the family relationships. Whenever a rule was imposed it was accompanied by threat of severe punishments if that rule was broken. Parental acceptance of Bobby depended upon his conformity to these rigid patterns of behavior. However, the rewards for good behavior were attractive to Bobby. He was given a liberal amount of money, not as a regular allowance but only if, in the opinion of his father, he had deserved it. The family car was available with close restrictions, and he was given valuable gifts at Christmas and upon other occasions. In this home environment Bobby functioned with considerable success. Only on rare occasions did he find himself in difficulty. Most of the neighbors and family friends thought of Bobby as an ideal boy, frequently holding him up as an example for their own children. But at school he consistently broke the rules, seeming to enjoy doing so.
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> Bobby went away to college. There he began to drink excessively, had several conflicts because of broken rules, did not achieve academically, and had two automobile accidents that were the result of recklessness. He was dropped from college because of these difficulties and failure in his academic program.

The values that appeared to be a part of this boy's earlier life were not really interiorized or made a part of him. Living by the rules was of secondary importance, whereas gaining the rewards given by father was primary. The catalyst in the climate that develops values is warmth and love. Rules and guides are interiorized when the child desires to make them a part of his own personal equipment. To prevent the superficial adoption of pseudo-values to gain other goals, the child should be shown that his acceptance as a worthwhile and loved individual does not depend upon the achievement of certain goals.

Values and the school. Do we teach values? Should we teach them? How is the development of values influenced in the classroom? These are questions vital to the concern of educators when they consider their role in this aspect of child development.

Whenever teachers teach or otherwise come into contact with children, they have an influence upon what is prized by the individual child as well as the group. It is the opinion of Childs [34] that "Schools always exhibit in their purposes and their programs of study that which the adults of a society have come to prize in their experience and most deeply desire to nurture in their own children." There is little doubt that educational experiences promote certain values and cast others aside. The school curriculum contains a multitude of value judgments made by those who have developed it. Whether or not schools should teach values is a meaningless question, because without value-judgments schools could not exist. The real question is, *How can we do a good job of teaching them?*

The processes whereby values develop have been discussed, and each of them comes into play in teaching. Satisfactions experienced as a part of school life are active in value-formations; therefore, every child should know the happiness that achievement brings. Pupils think of education as worthwhile and important if they realize that it is helping them achieve their goals. To accelerate value-development, the teacher-child and child-child relationships in school should be warm and friendly. This warmth of interpersonal relations readies the child to accept learning and paves the way for his acceptance of teacher and group values by the process of identification and introjection.

The study of cause-and-effect relationships provides opportunity for value-formation in the classroom. Any course of study in school can be approached from this viewpoint, and pupils become vitally concerned when teachers allow a departure from purely factual matters to a consideration of controversial elements of the subject. This approach is challenging to teachers because it requires a wealth of knowledge, careful and subtle control of group dynamics, and a willingness to allow the discussion of extreme viewpoints. Wright [35] discusses a classroom approach to values that includes the following important points:

1. The values to be discussed should be related to the interests, needs, and experiences of the group.

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[34] J. L. Childs, *Education and Morals* (New York: Appleton-Century-Crofts, Inc., 1950), p. 7.

[35] M. A. Wright, "How Our School Helps Youth with Value-problems," *Progressive Education,* XXVII (1950), 185-189.

2. Basic knowledge that pertains to the value under consideration should be made available to pupils.
3. Learning should be organized around a particular situation as realistic and close to pupil needs as possible.
4. The problem that is presented should involve conflicting values.
5. Free expression of present and future consequences of values should be encouraged.

A technique helpful in the teaching of values is the use of a survey of existing philosophies. This differs from the cause-and-effect discussion technique in that it involves the study of ideas and ideals presented intellectually as a part of the organized subject matter of the course. Reading about philosophical viewpoints serves to make the student aware of the values that are common enough to be included in literature. Along with this technique, the teacher may point out values as they are presented in movies, art creations, and moral or social situations that become a part of classroom activity.

Classroom discussion and other techniques influence value-formation, but they are more effective with some values than with others. Stendler [36] points out that school experiences affect the development of responsibility and honesty more definitely than they do loyalty, moral courage, and friendliness. Responsibility and honesty have less deep emotional content than the others and are more easily put into practice in behavior. Effectiveness of attempts to aid in the development of pupils' values is limited by the colossal weight of influences outside the school. Value structures are already begun before educational opportunities have a chance to be active. A concept once established is difficult to reorient, and teachers may become impatient and discouraged because immediate behavior modifications are not shown. But values are dynamic and teachers have always been influential in their development. Americans as a social group recognize this influence and place education high in the order of institutions for producing and maintaining socialization of its younger members.

What values should be taught? Any consideration of values that attempts to prescribe a set of concepts basic to social and personal living is bound to be criticized. Yet the hesitancy of educators to struggle with the problem of deciding what should be included in instruction results in the tendency to evade any classroom approaches to value development. It is in the realm of spiritual values that most of the controversy arises, and this chapter omits that very important group of values. But there are a multitude of others that rightfully belong in the educational experiences of children. There are clusters of values that involve specific kinds of objects and conditions and are associated with the basic trends of contemporary society.

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[36] C. B. Stendler, "Class Biases in the Teaching of Values," *Progressive Education*, XXVII (1950), 123-126.

Values that relate to the conservation of human life certainly belong in the educative process. Lives are sacrificed to individual whims when they should be preserved. All children, regardless of age, should be made aware of the value of a human life above all other concepts. It is assumed that children have such values, but frequent cases of negligent homicide indicate that values of this kind should not be relegated to chance development. Conservation of life should begin with the self-preservative instinct and move outward to include all members of society regardless of station. Students should be kept aware of the dangers of impulsive action, carelessness, thrill-seeking, and other actions that destroy lives.

Social concepts that involve personal and public property are also a matter for school concern. Pupils must know that others have property rights that should be observed. Stealing, willful destruction or vandalism, defacing and transporting property owned by persons and groups are examples of value-oriented behavior that can be discussed in the classroom.

Another group of concepts that cause trouble for young people involves their relationship with society at large. Laws are passed and enforced for the protection of individuals, and they have a rightful place in any system of values. Yet some youths challenge society's right to regulate affairs that involve their personal desires. A positive value should be given to a law simply because it has gone through the process of becoming a part of the public statutes. Whether or not it seems just to the individual is secondary to the welfare of the group. Through the democratic process laws are changed, and children should be taught to respect the process rather than disobey the law.

For successful social living children should be taught that traditional social institutions such as the family, church, and school have a valuable place in our culture. The family provides a sheltering influence for the long period of childhood and a setting for the transmission of cultural inheritance. Moral and spiritual values and precepts are handed down through generations by the church, which should occupy a high place in personal value structures. Without the school, social and personal progress would be severely handicapped, and children should be made aware of the tremendous influence of education upon their present and future lives.

Although our contemporary society has adopted a number of social agencies to provide for the basic economic needs of its less fortunate members, children still need the desire for self-maintenance and economic security. They should be taught to enjoy the accomplishments of work, and to have pride in self-sufficiency. The future of the system of free enterprise and democracy in government depends upon the preservation of these ideals. When a sizable group within a society depends upon the workers for their sustenance, political and economic freedom is threatened.

It would be possible to select other aspects of social living that merit inclusion in the curriculum, but it is necessary to turn to more general values. Quillen [37] has presented a detailed discussion of basic social concepts that, because of their social significance and relation to the educational program, should be developed in children of all ages.

1. *Man's common humanity.* The characteristics that make men human also provide a basis for equality, which in turn calls for mutual respect.
2. *The nature of culture.* A concept of the nature of culture and their culture heritage provides children with a means of interpreting their own behavior and understanding the behavior of others.
3. *Cultural change.* Knowledge of the process of cultural change helps children to comprehend incongruity in the present culture.
4. *Specialization and interdependence.* Comprehension of expanding cultural influences as they affect work specialization and the interdependence of people helps children to understand and appreciate co-operative action.
5. *The nature of democracy.* Children will appreciate and cherish the democratic process if they realize its nature and accept the tenets of liberty, equality, and fraternity.
6. *Concept of progress.* Children need to develop a concept of the progress toward a better and happier life, which democracy and technology together afford.

Values are not isolated from other learnings but exist as integrated elements of the total organism; they influence behavior and are influenced by behavior. School learning depends upon these concepts for motivation and in turn produces changes in them. It is this quality of interrelatedness that makes deliberate attempts to change values a difficult and lengthy process. But the fact that values permeate the organism accounts for their diversified influence upon behavior, and makes value-formation a justifiable educational concern.

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[37] I. J. Quillen, "What Are the Basic Concepts to be Developed in Children?" *Childhood Education,* XXIII (1947), 405-409.

Summary

A basic purpose of both formal and informal education is to produce individuals whose actions are motivated by interests, attitudes, and values that are gratifying to them and beneficial to society at large. These motivating influences are developed out of the entirety of personal make-up interacting with environmental forces. A changing human organism in a changing environment produces metamorphosis of existing purposes and standards. Transformations that occur are characteristic of the nature of the organism and of the forces that act upon it, making it possible for planned school experiences to influence modification of motivations. Planned change occurs when circumstances are created that permit children to realize that existing attitudes, interests, and values are not consistent with their long-range goals and objectives. The self-concept, of which attitudes, interests, and values are parts, develops through perception of the self as it influences others and reacts to various environmental phenomena. Development of a valid and consistent self-concept by each student is a desirable aim of education and one that can be implemented by teachers in the classroom and in other school situations.

Attitudes, interests, and values are important in the learning process because they influence selection of the stimuli to which the learner responds, the rapidity of learning, retention of the learned response, and application of the learned material. With the importance of these motivational factors in mind, the teacher should present instruction in a manner that appeals to each child. To approach new learning experiences effectively, it is necessary that the teacher be aware of the existing predispositions of each learner. Information devices such as tests, observations, case studies, cumulative records, and teacher-child interviews provide the kinds of information that teachers need for individualization of instruction to meet these predispositions to learning.

The purposive elements of the personality that are the subject of this chapter do not exist as isolated units but are integrated with all other elements of the organism. This interrelatedness accounts for the tremendous influence these motives have upon behavior and makes the process of deliberate change a difficult one. Yet teachers should feel secure in approaching children with determined efforts to produce beneficial changes, because it is rightfully within their domain. Responsive behavior may not immediately reflect the teacher's efforts, since there are other concomitant forces acting within and upon the child. The difficulty of the task and the feelings of depression that teachers experience in the face of apparent failure are outweighed by the instances that afford gratification and joy.

QUESTIONS AND EXERCISES
for discussion and study

1 What are the major points of difference between attitudes, interests, and values?

2 What personal and environmental influences are active in producing an attitude toward reading as a worthwhile pastime?

3 Give an example of a situation in which a child has a personal value that conflicts with an attitude, and explain how this is possible.

4 Relate a child's interest in trucks to approaches that might be used in teaching him reading, arithmetic, and social studies.

5 Outline a high-school course of study for a boy whose vocational interest is electrical engineering and whose aptitudes indicate potential success in the field.

6 What courses in the high-school curriculum provide opportunities for the development of appreciation of the fine arts?

7 What is the relationship of intelligence to vocational interests?

8 List the values that tend to promote acceptable school citizenship.

9 Give an example of conflicting interests and attitudes within the same child.

10 What approach would you use in attempting to reorient the values of a child who comes from a family where education is looked upon as a necessary evil?

11 Give an example of a pseudo-value and describe the personal and environmental conditions that might produce it.

12 Relate individual interests to vocabulary development.

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CHAPTER 13

Personal development during childhood and adolescence

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Becoming a person: fact and ideal

WHEN THE MODERN TEACHER looks at any learner in his class he sees a *person.* This concept of the whole individual—of the indivisible one—is highly significant in contrast with the idea of the learner as a mere aggregation of intellect, physique, emotions, social responses, and attitudes. Let us think about a few of the considerations that lead to an emphasis upon the "wholeness" of the pupil as related to the learning-teaching process.

Essentially, the day-to-day development of a young person is a *complex process of interaction* involving motor skills, mental insights, and emotional impulses going on under the influence of a social group and impelled by the interests of that individual. Whether or not the teacher or the learner is aware of it, emotions of affection or fear, preferences or dislikes, do influence favorably or unfavorably the intellectual grasp of ideas. No matter how completely the third-grade teacher concentrates upon Johnny's learning to read or the high-school teacher upon Susan's comprehension of biology, the social pressures exerted by their families and their peers inevitably modify the learning that takes place. Likewise, the biological processes of digestion and sexual development have their impact upon the progress of Johnny and Susan in their school tasks.

Moreover, the school tasks themselves enter into the complex pattern of interaction. No matter how deeply absorbed the adolescent girl and boy are in each other, their common membership in the high-school class, with its academic demands and disciplinary regulations, does affect them. Every experience involves the effect of other experiences that precede it and will affect those that follow in a changing but continuous pattern. So in regarding a learner as a *person*, the teacher recognizes the psychological *fact* of the interrelatedness of the many aspects of the individual's life. No teacher can safely ignore the fact that *the whole learner* comes to school—not just a "brain."

Again, consider how this emphasis upon the "wholeness" of the girl or boy is related to the *analysis* of the learner's development, which has been presented in Chapters 7 through 12. Certainly, the analysis of human development into such strands as the physical, mental, emotional, social, and attitudinal aspects aids the student of educational psychology in seeing more clearly and appraising more accurately the progress of any girl or boy in these distinguishable sequences. Moreover, the discriminating reader will have noticed that each author, in his specialized, analytical chapter, has pointed out and implied relations between the strand he was tracing through the school years and progress in other development strands. The practical usefulness of such analyses to the teacher depends, however, upon detecting the reciprocal interactions between events in such areas as the emotional and the intellectual, the physical and the social. For example, the study by Sollenberger[1] of the different degrees of physical maturity in a group of adolescent boys became more meaningful when compared with the results of the Furfey[2] interest test on these same boys. As might be expected, the high-hormone, sexually more mature group preferred to read novels and go out with a girl, as compared with the low-hormone group's preference for playing checkers and going to a Scout meeting.

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[1] R. T. Sollenberger, "Some Relations Between the Urinary Excretion of Male Hormone by Maturing Boys and Their Expressed Interests and Attitudes," *Journal of Psychology*, IX (1940), 179-189.

[2] P. H. Furfey, *The Growing Boy: Case Studies of Developmental Age* (New York: The Macmillan Company, 1930).

Thus, the fuller "meaning" is likely to be found in the middle or *mean*, in the *relation* between two facts exposed by analytic study of two strands of development.

Moreover, the classification of developmental activities, according to an obviously predominating characteristic under a physical, mental, emotional, social, or attitudinal title, is an *artificial division*. During the years in school no developmental, educational task can be performed that is confined to motor skill, intellectual insight, emotional impulse, social response, or personal attitude. All these aspects are involved to some degree in each significant act. Even the term "interaction" leads to a fundamental misunderstanding, when it is interpreted as a mechanical pressure of so much emotion upon an idea, or of so much physical energy upon a social contact. The "interactions" of personal development are not only many sided but highly fluid. Words like "interpenetrate," "permeate," "infuse" may suggest to the reader the psychological character of the so-called "interaction" process.

Nevertheless, however valid it may be to look critically at the analytic discussion, the separation of the learner's development into parts can be used as a scientific basis in reaching a synthetic, integrated view, at which this chapter aims. The practical consideration is that although the teacher needs different tools, such as physical growth measurements and standards, mental-age tests, projective techniques for discovering hidden emotions and attitudes, and sociograms to guide grouping within the class, the successful teacher chooses and uses these analytic tools with a view to the learner's development as a whole person. The wise teacher learns not only to *relate* the several analyzed aspects but to *balance* attention among the physical, intellectual, emotional, social, and attitudinal phases of development in terms of each individual learner as a member of the class group.[3]

A further warning to preface our consideration of the whole learner's development is that this unifying, synthesizing process too often goes awry in the person. Development is not always "wholesome." Emotions do not always supply the expected energy to the intellectual effort. Physical growth and social development get out of step. Fortunately, this lack of unity, this "split-growing," described so ably by Willard Olson,[4] does not often go so deeply as to produce a split personality in later life. Although interaction among the five aspects here treated analytically can be accepted as a fact, the process of development in our society does run into many rough spots. This lack of smooth and complete integration is so prevalent that it is well to assume that every learner will need guidance in many subtle ways to develop his potentialities into *the personality he might become.*[5]

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[3] For further consideration of the idea of the learner as a whole person, see Chapter 4.

[4] W. C. Olson, *Child Development* (Boston: D. C. Heath & Company, 1949, 1959).

As alert teachers become somewhat dissatisfied with the development of the young persons whom they are attempting to guide, they may find themselves going beyond the attitude of accepting the *fact* that becoming a person is a complex process to the step of setting up an *ideal.* As a teacher sees John and Susan struggling to "be themselves," attention focuses upon helping this boy and girl, and on what really is this vague, unique goal that each of us cherishes of "being myself." Whether they are aware of it or not, most teachers have in view goals for their pupils, which include along with appropriate scholastic progress something more. This "something more" is variously stated by teachers as healthful personality, adequate adjustment, all-round maturity for age, democratic citizenship, and in many other phrases. This general, open ideal is sufficiently important to keep in view as we pursue our inquiry into personal development during childhood and adolescence.

The emphasis in this chapter is upon the development of an all-round and more mature person out of an immature learner, who is perhaps insecure or aggressive. Our concern is with the *specific uses* teachers can make of their general understandings of the nature of development and its several strands. How can a teacher employ such knowledge meaningfully in dealing with learners at particular age levels and in specialized subject fields? Pertinent to the teacher's use of these understandings, it is essential to think of the teacher's task as located in a learner's life-span period of time and upon a cultural-space map. Attention will be turned also to the teacher's own life-span position and cultural-space location. Since development of every person occurs during the passage of time spanning months and years and through living at some spot in the culture, this two-dimensional orientation of learner and teacher may enable us to identify some of the major problems of development and to make some suggestions bearing upon their solution.

Life-span of the learner

The central, orienting question is: How does the teacher's perspective of the learner's life-span add significance to the limited period of learner-teacher contact? How does the teacher's understanding, specifically of the developmental process from infancy to old age, throw light upon the day-to-day decisions made in the classroom?

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[5] For further consideration of remedies for pitfalls on the way to wholesome personal development, see Chapter 5.

Although the year that a particular teacher typically has responsibility for the guidance of a certain group of learners is little more than one per cent of the individual's prospective life-span, this period constitutes an essential step for all and may be a crucial turning point, up or down, in the case of many a girl and boy. The location of this period of contact *early* in the career of the growing individual gives it special significance for two reasons. In the first place, the earlier a learner meets a teacher the more years lie ahead in which the beneficial or injurious consequences of the contact may reverberate *throughout the lives* of both learner and teacher.

Secondly, the impact of any event or personality is likely to be greater upon the relatively *unorganized and pliant* personality of the immature, uninformed child of six years of age than upon the more sophisticated and self-confident adolescent of sixteen. The older learner has had more time to weave around his inner self that protective covering called by James Plant[6] the "envelope." This tough envelope shuts out many of the social influences around the individual by a kind of unconscious ignoring of unwelcome pressures. As the person grows older, this ego-protecting fabric often becomes more tightly woven, until in some maladjusted individuals it gradually takes on the imperviousness of a "shell." Thus, the influence of the teachers in a school system may decline as the learner moves up from grade one to grade twelve. So. the *earlier* a teacher has his year or more with a group of learners. the greater his opportunity for influencing their whole lives significantly, "other things being equal," as the cautious social scientist consistently adds.

Viewed from this angle, it might seem that teaching in the elementary grades carries greater responsibility in the broad area of personal development than teaching in high school or college. Teachers at the higher levels may be saved from taking this logical conclusion too seriously, and passing up their opportunities to help the whole learner too readily, by remembering that in many cases that other things are *not* equal. Does not everyone expect the high-school adolescent to meet situations that are quite as crucial and important for his later life as any events in his childhood? The problem of the high-school teacher is to find ways to help the adolescent girl or boy in spite of the tough envelope or thick shell that may have accumulated around the self. Instead of accepting the notion promulgated in some quarters that personality is all tied up tightly at age twelve or earlier, the teacher of teen-agers may be assured that careful study or adolescents' common problems [7] is highly rewarding. Although the intricacies of adolescence makes it seem much more complex and perplexing than childhood, the translation of developmental principles, which apply equally to both periods, is entirely possible. More and more high-school teachers and principals are coming to realize that effective guidance of an adolescent group of girls and boys demands as much preparatory study and daily thought as does the teaching of geometry, physics, world history, or art. The understanding of varying individuals is as important to the teacher of teen-agers as the knowledge of the subject-matter for which he is responsible.

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[6] J. S. Plant, *The Envelope, A Study of the Impact of the World Upon the Child* (New York: Commonwealth Fund, 1950).

Actually, *every year* of the learner's twelve-year school period carries the significance of "earliness" in a probable eighty-year or longer life-span. Each year also is likely to carry its own special measure of "crucialness," so that the education of twelve-year-olds in junior high school is as significant as that of their younger and older sisters and brothers in elementary school or senior high school. Every teacher has the opportunity to make a substantial contribution to the whole life of every learner in the class group, although there is an every-recurring danger of missing that opportunity through neglect or through misunderstanding of the learner's present developmental problems, his background of growth, or his future prospects.

The teacher who becomes an able specialist in dealing with a particular age level, such as six-year-oldness or sixteen-year-oldness, does so not by studying that year of life in isolation, but through an extension of his understanding back into the preceding years and forward through imaginative insight into the long future. To know third-graders well is to know how they have lived in school and at home with their parents and siblings as well as in their peer play-groups during the first eight years or so of their lives. To teach ninth-graders well one needs to anticipate in some measure the senior-high-school years ahead and the vocational and collegiate studies to be encountered later. In giving adequate attention to the life-span setting,[8] the teacher can well take care not to look too far afield for guidance in his day-to-day planning of a program for seven-, eleven-, or seventeen-year-olds. Although wise teachers begin their practical developmental studies with their own age group and with today's events, using a direct approach, in which James Hymes[9] has given able guidance, they may wish to avail themselves also of procedures involving greater attention to the learner's developmental history, such as are presented by Daniel Prescott.[10] Each teacher, in accordance with the particular needs and opportunities, has to *balance* judiciously the attention given to current conditions and to past developmental history in working with a group of learners. Although living fully today is the best preparation for the future and the best corrective of a neglected or muddled past, the teacher has responsibility for adding to his interpretation of the present situation through light from the past and consideration of the future. Long before their school years are completed most learners can join their teachers in well-founded consideration of tomorrow's program and in looking somewhat further into the future. Seeing today's effort in the perspective of a life-span helps a teacher to see learners and himself *whole.*

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[7] See, for example, W. W. Wattenberg, *The Adolescent Years* (New York: Harcourt, Brace & Company, 1955), chaps. 14-20.

One fruitful phase of the life-span approach is to trace the successive *stages* from conception, at the very beginning of an individual's life, to its very end eighty years or so later. Teachers get valuable hints from the characterization of the stages of development as: (1) prenatal, with its tremendous rate of growth; (2) infancy, beginning in the ordeal of birth and very nearly setting, through mothering, life's social-emotional pattern; (3) early childhood, starting with understandable speech and marked by the development of leadership-followership in the first preschool mixed-sex, peer play-groups; (4) childhood, beginning with the first day in school and soon followed on the playground by withdrawal of girls and boys into the exclusiveness of a single-sex play-group; (5) later childhood or preadolescence, marked most significantly by the search for and often the fortunate finding of a chum of like sex; (6) adolescence, beginning physiologically with puberty and marked by a more-or-less consistent search for dates with the opposite sex; (7) youth, which for many may be identified with the "college age," a period of enlarged responsibilities but short of full economic independence for most; (8) young manhood and womanhood, often carrying with it repetition of the sequence in the new generation; (9) "middle age," which is scarcely definable; (10) retirement, which marks a difficult adjustment for some people and a happy freeing from tight schedules for others; (11) old age, which may be side-stepped through Bernard Baruch's words at eighty-seven, "To me, old age is being fifteen years older than I am." [11] Such dividing of the typical life-span into periods has its uses, but the heavier emphasis in educational psychology is properly upon the sequential and connected character of life, by which infancy and early childhood profoundly affect the learner's school years, and by which the teacher's own school years may affect his ways of teaching youngsters in his adulthood.[12] Since there is no distinct break at the second, sixth, twelfth, twenty-first, or fortieth birthday, any characterization of a particular period is best understood by comparing it with the preceding and following period. For example, the very title of this chapter handicaps the discussion slightly by implying a breaking of the school years into two life-stages—childhood and adolescence. Relatively few statements in the chapter apply exclusively to either period; as a result, the word "learner" is used to include both groups. It is to be hoped that the student of educational psychology will think consistently of the child and adolescent as constituting *one person*.

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[8] See also, S. L. Pressey and R. G. Kuhlen, *Psychological Development Through the Life Span* (New York: Harper & Brothers, 1959).

[9] J. L. Hymes, Jr., *Behavior and Misbehavior: A Teacher's Guide to Action* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1955).

[10] D. A. Prescott, *The Child in the Educative Process* (New York: McGraw-Hill Book Company, Inc., 1957).

In locating the learner's *present stage* of development, the teacher can well turn to the graphs of physical growth, to the tables of reading and mental age, and to the tests of social maturity, thus locating the areas of present attainment, one at a time. The descriptions of accomplishments and of worries most common at particular ages are also full of suggestions to the alert teacher. Although it is often difficult for the teacher to transfer to the particular living learner such generalizations of the psychologist about attainment and behavior, this task is being performed ably by many an experienced teacher. (Incidentally, the measure of an "experienced" teacher is not necessarily in the number of years spent in the classroom, but in the way the teacher grasps opportunities to "experience" more fully what is occurring in the class group.) As has been said elsewhere, "If, instead [of driving ourselves and our pupils all day], we sit quietly in the back of the room [during a pupil demonstration or a pupil-led discussion] observing this pupil and that pupil and considering the character of the relationships among the pupils, the rewards are great. . . ."[13] Indeed, there are double rewards, for sometimes the teacher can identify his own stage of development as teacher and personal guide, at the same time he is appraising the attainments of learners.

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[11] A. Gonzalez, and J. Gonzalez, "Life Begins at 40 (× 2)," *The New York Times Magazine*, June 22, 1958, p. 11.

[12] W. F. Bruce and A. J. Holden, Jr., *The Teacher's Personal Development* (New York: Henry Holt & Company, Inc., 1957), chaps. 6, 10.

The *cumulative impact* of the whole school system upon each learner may be multiplied many times, when the twelve-year span from entering first grade to graduating from high school is given unity through careful planning and full cooperation by the entire school staff. This cumulative effect may be seen clearly as the result of continued attention to the language arts of reading and composition, of sequential courses in mathematics, science, and social studies, and of skills and appreciations in the practical and fine arts, in music, and in the dance. In such continuing fields the learnings of each year are built upon the work of the preceding years and contribute directly to the higher quality attainments of succeeding years. In the realm of general personal development—in habits of study and methods of inquiry, in standards of honesty and industry, for example—this cumulative effect may be still more marked, when a mutual understanding of such prime objectives of education is developed throughout the whole school staff. In this process of fostering high standards of workmanship, ethical norms of behavior, improved human relationships, and group morals, the pursuit of common purposes by learners as well as by teachers and other staff members through twelve closely articulated years may bring amazing results. The total effects may run far beyond the arithmetical multiplication of twelve times one year, because the personal qualities, such as initiative, fair play, and insightful thinking, developed in the early grades not only serve throughout the whole period but cut across from subject to subject to increase greatly the fundamental scholastic progress. Thus, the school system, in which the importance of this twelve-year period for the whole life-span is fully appreciated, may have a profound effect upon the *efficiency and character of the learner-person.*

As parents and taxpayers have come to appreciate more fully the value of a unified educational system that is diversified sufficiently to serve all local youth, advanced communities have begun extending public education beyond the typical twelve-year period. Two alternative possibilities are being explored widely in the United States. One starts public education earlier, with nursery school and kindergarten; the other extends tax-supported local education later, with a two-year community or junior college.

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[13] *Ibid.*, p. 22.

Shall we add to the public school a one- or two-year preparation of young children as an introduction to the verbal arts or three R's? Careful studies have shown that attendance for a few hours daily at a kindergarten definitely increases the efficiency of children in the language arts, which are the fundamentals of education, partly by promoting reading readiness by shared picture-books and participation in story-telling. The most distinctive contribution being made by nursery schools and kindergartens lies in the realm of Ashley Montagu's fourth R, "right human relations."[14] The unknown degree to which "right human relations" are developed by three-, four-, and five-year-olds under the supervision of teachers who understand young children and themselves, to their later increased efficiency in language skills, constitutes another illustration of the interrelations between social-emotional and intellectual aspects of education and personal development. Such complex considerations enter into a wise decision about extending the school forward into earlier childhood.

Or, shall we add to public schooling at the other end a two-year, community junior college? If so, shall it be devoted exclusively to "general education" or shall vocational preparation of more specific kinds be included? Shall this extension of public education be related closely to local needs or to national policy? These questions and many others enter into any thoughtful consideration of the value of two more years of education at the end of the customary twelve.

Teachers and other professional educators can aid parents and the public generally in making wise decisions concerning the alternatives mentioned above. Often the question will tend more toward the form of an extension at both ends, giving a school-span of sixteen or more years rather than a mere twelve. Certainly, some children need the pre-school instructor more than others, and some adolescents can use an extension beyond high-school graduation more profitably than can others. In either case, or a combination, the life-span perspective can contribute substantially. The more seriously the life-span approach is taken, the more deeply does the inquiry probe into the significant problems of the all-round development during a childhood that begins six years *before* school entrance and an adolescence and youth period in which maturity advances rapidly for some years *after* compulsory schooling ends, high-school graduation day passes, and physical growth in height ceases. In conclusion, it may be added that the concept of "development" presented here tends to identify it with the life-span. All life is educative, and oldsters, even if they be teachers, can still learn.

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[14] A. Montagu, *Education and Human Relations* (New York: Grove Press, 1958).

Cultural space of the learner

Another enlightening perspective comes to the teacher through locating the members of his school group in *cultural space.* In a sense, each learner can be spotted on a sociological map. This turning from the life-span time perspective to the cultural-area space perspective in looking at a particular learner is analogous to turning from history to geography in studying the life of a nation. The teacher changes roles from being a biographer to becoming a sociologist. As the student of educational psychology may already suspect, however, the two approaches are *complementary.* As history and geography have been combined by many elementary schools in a social studies course, so the teacher of today uses both developmental case histories and sociograms. As in all existence the dimensions of time and space act together, so this discussion of cultural space supplements the life-span approach.

Notice further that the "development," with which this chapter is concerned, is quite as dependent upon "cultural space" as "time to grow." Due perhaps to an overemphasis upon biological processes in the century following the writings of Charles Darwin[15] on evolution, the word "development" is still more readily associated by most people with "natural growth" than with "learning to live with others." The preceding chapters in this part of the text make abundantly clear, however, that development is quite as much a matter of social learning as of biological growth. If general psychologists, like Lawrence Cole,[16] speak of their subject as a bio-social science, certainly students of educational psychology concerned with the development of young persons may well consider the cultural-space map along with the life-span sequence.

When an American teacher is employed by a school in Japan, Germany, or any other foreign land, he realizes that he must study the culture of these people if he is to serve them well. Like an anthropologist studying a little-known tribe, who must learn much about local foods to avoid illness, about the local manners, to avoid shocking the people he meets by his (to them) crude behavior, and about their cherished beliefs, to avoid "misunderstanding," in which intellectual misapprehension is complicated by emotional resentment—the teacher within our own United States has a similar responsibility when he moves on the cultural map from one state to another, and especially from one region to another. Even a move from one part of a state to another, especially in exchanging rural and urban surroundings, may call for a study of local customs and points of view. Before the teacher can begin locating the learners in his class on a cultural map, he may need to reorient himself sociologically.

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[15] C. Darwin, *Origin of Species,* 1859. For an interesting account of Charles Darwin's own personal development, see J. Huxley, "Darwin Discovers Nature's Plan," *Life,* June 30, 1958, pp. 63ff.

[16] L. E. Cole, *Human Behavior: Psychology as a Bio-social Science* (Yonkers, N. Y.: World Book Company, 1953).

Whereas a teacher who makes a big jump from one culture to another across the Pacific or Atlantic Ocean, or across the American continent, or even across a state line may be aroused by the geographic length of his journey to make a sociological study of the new situation, the teacher who moves from one community to another within a state or even a county may fail to realize his need of a cultural reappraisal of the social environment. The alert teacher, however, will begin asking himself: What are the special assets of this community that affect the work of the school? What are the liabilities that directly or indirectly interfere with the development of learners? What special care is advisable in approaching parents and pupils here? Such aspects of the teacher's preliminary cultural survey of the community are concerned both with fitting himself into the community and with appraising the environmental factors impinging upon the learner. In the beginning, the teacher need make no sharp distinction between locating himself and locating the learners on the community's cultural map, since the teacher's concern is with his *relations* with learners and their parents in this more-or-less strange cultural matrix.

This preliminary consideration of the general cultural location and characteristics of the school community can become, of course, a broad, sound basis for learning about the particular family backgrounds of the pupils. It may be quite as important in guiding a learner's development to know what his father does, whether his mother is working outside the home, and how the parents regard the school, as to see the learner's physical height and mental age on a dated chart. However appropriate or inappropriate the designation of families by social class—upper, middle, and lower—may seem to be in a certain community, there is no doubt that the home environments of the pupils in a school class are likely to vary significantly. So the teacher's cultural-space map of the community will be as variously spotted as is the range of slow and fast growers in the time-maturity scale. Furthermore, the *relations* between the learner's rate of academic growth and his cultural location will often add meaning to both facts.

Teacher's life-span and cultural-space

Although the teacher is locating the learners of his group upon a cultural-space map and in a time- or age-maturity graph, he may well make significant corrections of his interpretations of these observations. Each of us tends to think of the age of others as relative to our own birthday. Likewise, a rich person is anyone who has a larger income than a schoolteacher. In thinking about the learners it is difficult for a teacher to realize the degree to which his appraisals may be distorted by his own age or social position.

Each of us tends to appraise other persons, including parents and colleagues as well as pupils, in terms of our own cultural experience. Many of us feel that the way we were brought up in our parents' homes and the way we developed in a certain community during childhood and adolescence is the way all youngsters *are* or *should be* developing. We are inclined to accept as "right" the manners, customs, and beliefs of our own cultural heritage, even after we have learned from books and to some extent from observation that the moral norm of behavior in other communities is quite different.

Since most teachers are drawn from families who occupy a middle position economically and socially in their communities, it has been alleged that these *middle-class teachers* do not understand the habits, points of view, and interpersonal relations common in the families of their pupils whose families occupy a lower or higher position on the social scale. In some cases a lower-level family may also be descended from recent immigrants to the United States and so have a foreign tinge in their culture, which sets them apart still further from the origins and ideals of the teacher's own upbringing. Thus, an early step for any teacher toward wise guidance of all the youngsters is to recognize the probability of many of them coming from a different cultural background and the value of awareness of contrasts between his own position and theirs upon the sociological map.

The teacher's awareness of different cultural antecedents need not involve, however, a "looking down" upon this other way of life as undesirable, nor a "looking up" in envious disparagement at an upper-class family. Rather, this awareness may lead toward a more intelligent "looking into" the cultural development of the learner and his teacher as well. Instead of assuming that certain girls and boys are going through life "on the wrong track," the teacher who appreciates the diversities of cultures may enter more sympathetically and effectively into planning with the parents and pupils the next steps in their educational-developmental program. This cultural awareness may be an essential step toward a mutual appreciation of the relative importance or unimportance of spelling, pronunciation, grammar, and other aspects of American-language use, of mathematics, science, music, art, and other scholastic fields. Since none of these special subjects can be approached with full effectiveness without the interest of the "whole learner," the wise teacher remembers how dependent is the motivation of the "whole learner" upon the attitudes of his family toward education and how closely these attitudes are related to certain cultural positions on the sociological map.

On the other hand, teachers in many schools will be facing some learners whose family background is considerably higher economically than that of their teacher. Whether or not there are obvious social and intellectual differences between the parents and the teacher, most teachers do have pupils in whose homes they would feel a bit strange because of an ill-defined but impressive "upper-crustness." Some of these families may look upon education quite differently from the way many "practical-minded" teachers do. So the "middle-class" teachers of America are said to have another kind of cultural mapping problem basic to promoting the development of pupils who have absorbed the upper-class attitudes of their families.

Furthermore, there are other differences between families that cut across all social levels, such as the contrasts between the happy and the unhappy, the autocratic and the democratic,[17] and the one- or two-child and the larger families. Thus, teachers may well be aware of the many aspects of family life, besides social-class position, in which they may be biased by their own childhood experience. Teachers need to safeguard themselves in other areas besides their middle-class origins and attitudes. Actually, the difference between a teacher's happy childhood in a big, democratically run, farm family and that of a pupil who also may be growing up on a farm under different family conditions may be much more significant than differences derived from social class or urban residence. In sum, the teacher's cultural awareness may be a very useful corrective in looking at learners, provided this one aspect of difference or similarity with the teacher's background is not allowed to dominate the scene.[18]

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[17] A. L. Baldwin, J. Kalhorn, and F. H. Breese, "Patterns of Parent Behavior," *Psychological Monographs*, LVIII, No. 3 (Evanston, Ill.: American Psychological Association, 1945).

Before taking up another topic, we should remind ourselves that alongside and merged with the teacher's sociological mapping of cultural *space* goes the significance of *time* in terms of the learner's age level. Many a fourth-grade teacher or teacher of high-school algebra is influenced more than he is aware by his own youthful experiences in the fourth-grade or the algebra class. He may well ask himself: Am I imitating or rebelling against the kind of teaching I received by a certain fourth-grade teacher or in the complexities of algebra? Am I unconsciously "identifying" with a teacher I admired or "projecting" a corresponding image upon my pupils? How much is my judgment of what these fourth- or ninth-graders "need" a reflection of what I felt I needed at ten or fifteen? How fully do I realize the difference between the current TV and nuclear-fission environment of these youngsters and the surroundings of my own school years. By a reasonable amount of such questioning, a teacher may come nearer to guiding development in the light of what is going on today rather than falling too easily into paths laid down in his own "unconsciousness" by the personal experiences of a decade or more in the past. With conscious attention to *both time and space orientation*, the teacher stands a much better chance of seeing the actual developmental position and prospects of each learner in the group.

Teachers' objectivity and respect for learners

Much that has been said here concerning time-space orientation has emphasized the value to the teacher of being *objective* in appraising a learner's development in order to guide him wisely. That is, the scientifically oriented teacher attempts to escape from perceiving learners "subjectively," clouded by his own personal life-style. On the other hand, no school wants a teacher who is so coldly objective that he becomes detached from and loses his warm concern for every youngster in his class. Can "objectivity" be reconciled with friendly interest in the learner's development? A suggestion from Erich Fromm [19] indicates that when we incorporate in the idea of "objectivity" an attitude of "respect" for each individual, teachers can reconcile their warm concern for the learner with a realistic appraisal. This reconciliation is enhanced, moreover, when the teacher is able to *see himself as he really is.* Under these conditions, the energy of personal interest and the intellectual acuteness of scientific objectivity can reinforce each other. The teacher who uses such instruments as the Wetzel grid [20] and the Lincoln-Oseretsky Motor Development Scale [21] in measuring physical development, a mental-age or reading-age test in measuring intellectual development, and scales indicating social-emotional maturity, is no less a friend of the child than the teacher who cannot obtain such aids or neglects their use. In any case, the teacher has to go beyond these measurements to consider interpretations in which the attitude of "respect" may serve him well when supported by a sensitive awareness of his own inclination toward a biased view of the learner derived from his own personal history.

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[18] D. Riesman, "Teachers Amid Changing Expectations," *Harvard Educational Review*, XXIV (1954), 106-117.

Group membership and the learner's personal development

As a teacher comes to realize more fully the particular uniqueness in physique, intellect, and attitude of each young person developing under his guidance, he may have a passing desire to devote himself to just a few learners, one at a time, rather than to continue the scheduled meetings with the usual class of twenty-five or more. On second thought it becomes clear, however, that each of the twenty-five will develop most effectively as *a member of a group.* The daily interactions of human beings help them develop as *persons.* Although too many learners are often crowded into a single teacher's class group for most effective social interaction, the working in groups that economy of school organization dictates is a decided asset in the learner's all-round development. Much of a person's manual habituation, of his language facility as an intellectual resource, of his emotional stability in the face of tension, of his humane attitudes toward others, of his expanding interests, and of his moral valuations are learned incidentally through contacts within his peer group. One of the teacher's prime tasks is to see that the class *as a group* makes full use of these socially developed means for educative ends. If a teacher were assigned to tutorial work with individuals, one of his first educational steps, if he were concerned with anything more than a narrow academic acquisition of subject matter, would be to provide some form of group life between tutorial sessions. As the practical situation stands in most of our schools, the teacher is assigned a more-or-less selected list of individuals, who may or may not bring with them some group feeling from previous association. In this common situation, one of the teacher's fundamental responsibilities is to develop from these somewhat socially raw individuals an interacting, working group, to foster attitudes of mutuality and group concern.

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[19] E. Fromm, *Man for Himself* (New York: Rinehart & Company, Inc., 1947).

[20] N. C. Wetzel, "Assessing the Physical Condition of Children," *Journal of Pediatrics,* XII (Jan.–Mar., 1943), 82-110, 208-225, 329-361.

[21] W. Sloan, "The Lincoln-Oseretsky Motor Development Scale," *Genetic Psychology Monographs,* LI (1955), 183-252.

Since grouping is so significant for all-round education and personal development, the next question may be stated: What is the sequence of group living for children and adolescents in our culture, and what may the various stages of this sequence mean for school education?

In the beginning, before he comes to school, the child is a member of a family group and so continues during his school career. Joining a school class adds a new social dimension to his group life. During his twelve-year school period from age six to eighteen, the young person undergoes a psychological weaning from the limited family contacts, thus being led toward the broader social relations of adulthood. The series of teachers whom the learner encounters on the way may be of great assistance to him in his advance from a dependent early childhood to a considerable degree of independence by the time he drops out of high school or graduates successfully. This independence is highly important to a young man or young woman in going out on a job, into apprenticeship training, or on to college. The persisting question is: How can teachers and parents weave together in proper proportions the influences of home and school so as to promote intellectual integrity and emotional health? This process of sharing richly in both family and school groups calls for a mutual regard by parents and teachers for the young person's own developing life rather than a too common competition between home and school for his mind and heart.

Unfortunately, some families are not equipped to contribute much to the development of their offspring. Consequently, the school becomes for such children a *residual institution,* that is, the caretaker for left-over requirements of development. From milk through manners, from school supplies to affection, the school and its teachers set out to supply deficiencies, because the educational goal is a mature, well-rounded person. The school seeks to help these unprivileged children in whatever ways seem feasible, largely to enable them to become full participants in the group life of the school. This full participation may be regarded, if the teacher prefers, as a *means* to the *end* of more effective study, greater and speedier comprehension in mathematics and science, freed initiative in the arts, originality in literary composition, greater reading ability, or any other set of scholastic "ends." More is accomplished in both scholastic progress and all-round personal growth, however, by teachers who comprehend the *relations* of the scholastic and personal aspects of development so that for them both aspects are seen as "means" to an inclusive "end." This development of full participation by all depends heavily upon the classmates or group members working together in a democratic atmosphere fostered by a wise teacher.

Most learners substantially supplement their group living in home and school with membership in *peer groups* outside, largely beyond the watchful eye and guiding hand of either parent or teacher. The relative freedom from control in these groups is often considered a serious problem by their elders. The typical learner passes through a long sequence beginning with mixed-sex play-groups before school entrance, developing into separate groups of girls and boys with differing activities while in the middle elementary grades, often pairing into boy chums and girl chums during preadolescence and also forming more-or-less tightly organized single-sex crowds or gangs. Then, as adolescent growth gets under way, the group turns toward engaging in social parties of girls with boys, followed by some girl-boy pairs going "steady." The sequence culminates for an increasing number of pairs in marriage during the late high-school or early college years. Then comes the first baby and the group-life sequence has begun again with a new generation.

This sequence, which is often spanned in twenty years by groups acting largely under their own initiative and control, has profound effects upon the personal life, and thereby upon the scholastic progress, of every learner. Certainly, the teacher is almost *socially* blind if he does not sense the great influence of the peer group upon the general motivation of learners and upon the development of interests by elementary and high-school pupils in science, social studies, literature, the arts, and other academic fields. Although it is not the function of this chapter to detail the peer-group relationships that bear most heavily on the work of the teacher, a few lines of inquiry into this significant area may be suggested. Beginning in the first grade, the teacher notices boys and girls who are shy or troublesome—not learning themselves and contributing nothing or negatively to the group work of the class. These difficulties are sometimes traced to a lack during the preschool years of play-group opportunities due to such circumstances as rural isolation or to parental errors of overprotection and pampering, especially of an only child. Many children have been freed from such education-blocking personal defects by the rough-and-tumble responses of a play-group.

Another notable instance is *chumming* in preadolescence by pairs of boys or girls, which is being increasingly recognized as strongly contributing to the emotional stability that underlies consistent effort at tasks in school or elsewhere. This minimum group of two is a prime illustration of the principle of "least-group-size," by which, as Thelen [22] indicates, for each learning task the optimum or most effective grouping is the smallest number in which is represented the socialization and achievement skills required in that kind of work. It appears that the small, intimate group of two chums can often help both members to self-understanding and emotional stability more effectively than can any larger peer group. In calling attention of educators to the deep psychological significance of chumming of pairs of boys or girls, especially during preadolescence, Harry Stack Sullivan [23] may have contributed greatly to the teacher's appreciation of the value of peer relationships throughout the life-span.

In the high school much of the teacher's hope for these maturing adolescents can well be placed in the development of group morality by these young people largely "on their own." From early childhood to adult maturity, human beings have to be trusted more and more in constructively interrelating the physical, intellectual, emotional, social, and valuational aspects of their lives. When their teachers are aware of the force and character of the peer-group life, these adult guides are in a position not to control but to suggest by word, and especially by example, ideals to pursue and ways to use group contacts, in school and out, to humanize each growing person.

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[22] H. A. Thelen, "Group Dynamics in Instruction: Principle of Least Group Size," *The School Review*, LVII (Mar., 1949), 139-148.

[23] H. S. Sullivan, *The Interpersonal Theory of Psychiatry* (New York: W. W. Norton & Company, Inc., 1953), chap. 16. See also Bruce and Holden, *op. cit.*, chap. 7.

This brief review of the group life of girls and boys outside the school and the home, with mention of the special significance of early-childhood play-groups, of preadolescent chumming, and of adolescent, self-disciplining youth groups, may suggest to teachers a wide area of background information useful in deciding about grouping procedures in forming school classes and in organizing subgroups within different classes for various scholastic ends. In general, the study of group dynamics may show how to use for educative purposes the *vital social energy* that interaction within peer groups offers the alert teacher.

Relationships among aspects of development

Another way of sensing the *actual relations* among the aspects of human development, which in the preceding analytical chapters have been classified as physical, mental, emotional, social, and attitudinal, is to consider certain *cross effects* that recent research has exposed. These cross relationships suggest to the student of educational psychology and the practicing teacher both problems and remedies about which all adult guides of youth may well be concerned. In all these areas increased understanding will come as school systems are challenged to try out the implications of current psychological studies. As examples, let us inquire into the relations of emotional love and physical growth, bodily nutrition and mental development, physical motility and intellectual insight, speech control and emotional tension, verbal understanding and emotional adjustment, personal affection and social discipline, social development and personal values, and finally into the relations of development and learning. Although our discussion deals with pairs of developmental aspects, the student of educational psychology will no doubt sense many other relations that cross over from one pair to another, constituting the complex psychological web in which learning is enmeshed and by which the educative process is advanced.

Emotional love and physical growth. Although the physical growth of an infant or older child depends directly upon nutrition, research has shown that "without love often a baby dies." The studies of

Spitz,[24] Ribble,[25] and others demonstrated that unless someone lovingly "mothers" the infant in cuddling arms, his food does not digest. Although a hospital or other institution may provide the chemically correct formula and complete sanitation for each baby in the ward, something more is needed—the touch of a "mothering one," either nurse or natural mother, who takes time to pick him up as he sucks his bottle. Every individual has as much "right" to emotional love in his first year as to the vote in his twenty-first.

This relation between affection and healthy physical growth in infancy has bearings in unknown degree upon the school education beginning six years later. The teacher may have to make allowance for the girl or boy who just managed to get through babyhood on a minimum of love and who may have suffered from parental neglect during the whole early childhood period. Besides having a weak body the child deprived of affection is apt to be apathetic and also slow in giving out affection and in making friends. Consequently, it is difficult for such a child to enter freely into the group activities that contribute so much to learning in the first grade.

To what degree love to and from others continues to be tied up with physical growth, motor skill, intellectual development, and social adaptability during the elementary and secondary-school years is not definitely known and no doubt varies from individual to individual. The scientific evidence is clear enough from the early years onward to suggest to every teacher that emotional and physical conditions must be considered together in appraising and promoting development. Although the first-grade teacher can scarcely be a "mothering one" to twenty-five girls and boys and cannot in the sixth year recover the developmental ground lost by parental neglect in the preschool years, the child's first teachers can give an added touch occasionally to the lonesome one and give the isolate special help into peer companionship. The affection of playmates and schoolmates becomes an essential resource for many a child neglected by his family. To a degree the school that strives for high intellectual development becomes a "second home" to many children. In this concern, the teachers of the upper elementary grades and the secondary school may well look for inspiration and guidance to the most "understanding" of nursery-school, kindergarten, and first-grade teachers.

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[24] R. Spitz, "Hospitalism," in A. Freud, H. Hartmann, and E. Kris (eds.), *The Psychoanalytic Study of the Child* (New York: International Universities Press, 1945).

[25] M. A. Ribble, *The Personality of the Young Child* (New York: Columbia University Press, 1955). See also, by the same author, *The Rights of Infants* (New York: Columbia University Press, 1943).

Bodily nutrition and mental development. The relation between adequate food and success in school work is obvious enough. Even in economically prosperous times in our United States, enough children still come to school hungry to keep this relation before their teachers. The provision of free milk and other foods for all children has had such beneficial effects as to be accepted as a wise expenditure of public funds. How deeply this relationship between nutrition and intellectual capacity runs may be illustrated by research upon one form of mental deficiency, called *cretinism*. In the cretin child there are deficiencies in the material supplied to the blood stream during the prenatal as well as the postnatal period by the internal or endocrine glands, particularly the *thyroid*. When this condition is discovered during the mother's pregnancy, she can be fed the materials that the defective glands fail to supply and the infant can be fed such materials after his birth. This early feeding of the thyroid hormone results in improved physical and mental growth.[26] Any strict separation of physical and mental development constitutes a misleading "compartmentalization."

Physical motility and intellectual insight. Before he comes to school the young child gains much understanding of the world about him through his bodily activities, but his schoolteachers do not always make full use of the intellectual powers that have come to him through physical motility or manual dexterity. Nor does the school always provide as much opportunity as it might for learners to translate words into action and physical activities into mental insights.

In assigning credit for human evolution, man's hand might be granted a considerable share of a credit ordinarily given to the human brain for ascent above such mammalian relatives as the rat, cat, dog, and ape. The human child's ability to grasp with apposed thumb and index finger, developed by the fortieth week after birth and followed soon by standing and walking, puts the two-year-old near the manipulative level of the adult and far above the other mammals in his equipment for handling, trying out, taking apart, and other forms of intellectual investigation. When the student of educational psychology combines an appreciation of physical development processes in young children, as presented by such writers as Mary Shirley,[27] Arnold Gesell,[28] and Myrtle McGraw,[29] with the revelations of animal intelligence on the insight level, through the sudden "seeing" of relations rather than blind fumbling, as presented by the Gestalt psychologists,[30] he can begin to sense more fully the back-and-forth relations between physical motility and intellectual understanding.

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[26] Cole, *Human Behavior, op. cit.*, p. 133; L. E. Cole and W. F. Bruce, *Educational Psychology* (2nd ed.; Yonkers, N. Y.: World Book Company, 1958), p. 75.

Fortunately, the age-old barriers between verbal learning and physical doing were broken down in the elementary school by the "activity movement," under the leadership of the Progressive Education Association in the 1920's and 1930's. There still continue to be many opportunities, however, to extend in the schools the relationship of motility and visual perception, on the one hand, with intellectual comprehension, on the other. Again, the possible unity, for which our tradition lacks suitable words, has to be expressed awkwardly as intellectualized motility or body-mind development. The pertinent point is for the educator so to guide what the learner is *doing* as to relate it to his *thinking*, and to help him test his abstract, general ideas by concrete, specific experiments. Although the psychologist may well state the problem as the relation of percepts and concepts, any teacher can discover unity by examining in his own class group the relations between activities and understandings.

Speech control and emotional tension. Clarity in speech on the part of learners is essential in the school. Many teachers have at last discovered that talking is a kind of action that promotes more understanding when the pupils are given their fair share of the time devoted to talk. Although a boy or girl may have speech difficulties that are related to defective anatomic structures, such as harelip or cleft palate, the far more common difficulty is a functional interference due largely to emotional strain. More aid would come to learners, who are plagued by such functional speech difficulties, by the coordination of the "speech specialists'" suggested remedies, based upon reconstructing habits through practice, with the advice of "clinical psychologists" based on a psychoanalytic approach.

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[27] M. M. Shirley, *The First Two Years of Life: A Study of Twenty-five Babies* (Minneapolis: University of Minnesota Press, 1931), Vol. I, "Postural and Locomotor Development"; Vol. II, "Intellectual Development."

[28] A. Gesell, *et al.*, *The First Five Years of Life* (New York: Harper & Brothers, 1940).

[29] M. B. McGraw, *Growth, A Study of Johnny and Jimmy* (New York: Appleton-Century-Crofts, Inc., 1935).

[30] W. Köhler, *The Mentality of Apes*, E. Winter (trans.) (New York: Harcourt, Brace & Company, 1925).

K. Koffka, *The Growth of Mind*, R. M. Ogden (trans.) (New York: Harcourt, Brace & Company, 1925).

K. Lewin, *Field Theory and Learning*, Forty-first Yearbook of the National Society for the Study of Education, Part II (Bloomington, Ill.: Public School Publishing Company, 1942), pp. 215-242.

R. M. Ogden and F. S. Freeman, *Psychology and Education* (New York: Harcourt, Brace & Company, 1932).

Examples of lack of speech control, in the form of stammering, are found from early childhood through the school years and into adulthood. Let us look at two cases: first, a two-year-old girl; second, a thirty-one-year-old man. The two-year-old had met a competitor for mother's affection in a new baby brother. In some cases, to quote Gardner Murphy,[31] "the child is blocked, thrown off dead center, by this experience. . . . Since the sense of blocking is quickened when the rival is in range of eye or ear, the result may be the tension of stammering. . . ." In the adult case described by Rivers[32] and critically analyzed by Cole,[33] an army officer, who had stammered as a boy and had been practically cured, *returned* to stammering under the *tension* of battle fatigue or war neurosis. No matter whether the stammerer is a preschool child, a boy or girl in elementary or secondary school, or a grownup, the psychologist, after an examination of the victim's mouth for physiological defect, goes on to look for sources of tension in the history of the individual.

As suggested in Chapter 6, the teacher who encounters the stammering boy or girl should make certain that the school itself is not contributing to strain and tension in its insistence on clear, prompt speech or in other ways. Although the specialist who is trained either in speech techniques or in psychology, preferably in both, may be helpful working by himself, his contributions may be much sounder when he works closely with the stammerer's teacher. The teacher may be able to supply information about the tensions pressing upon the boy or girl in the school, on the playground, and in the home. In addition, any remedies are carried out most effectively through consistent cooperation between parents and teachers. In general, stammering is another illustration of a bodily condition that is closely tied psychologically to the emotional aspects of development.

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[31] G. Murphy, *Personality* (New York: Harper & Brothers, 1947), p. 587.

[32] W. H. R. Rivers, *Instinct and the Unconscious* (Cambridge, Eng.: Cambridge University Press, 1922).

[33] Cole, *Human Behavior, op. cit.*, pp. 203-207.

Verbal understanding and emotional adjustment. Another area in which the world of words and the world of emotions come into contact is the process of intellectual comprehension. The school is obligated to deal largely with verbal symbols, since it is by reading the writings of the past and present that the culture accumulated over the ages is transmitted to each new generation. Even the TV set's contribution to progress in school [34] depends heavily on words. Without discounting the great contribution of language,[35] which is an even more distinctive asset of the human being than his flexible hand, it has been widely recognized, even before the contributions of the semanticists, [36] that people often misunderstood each other because they used the same word with a different meaning. Although there are many factors involved in the difficulty that learners have in understanding the statements of their teachers and textbook writers, one of the most troublesome is the emotional content many words carry. Although it is often assumed that a word is a pure intellectual symbol, which can be neatly defined, it turns out often to be a carrier of impure or at least misleading notions The possibility of being misled may be the result of an emotional maladjustment in which a personal twist is given by the learner to the teacher's suggestions or by the teacher to the learner's attempted contribution to the class group.

Inasmuch as emotional adjustment has been discussed elsewhere in this volume,[37] it may be sufficient to remind the student of educational psychology that the social studies especially are filled with terms, like "labor union," "middle-class American," and "democracy," that produce different attitudes when heard or spoken by learners with diverse family backgrounds. Even teachers may have prejudices [38] that sometimes creep into words they are using in the classroom. Thus, the apparently intellectual process of verbal learning-teaching can scarcely go on rationally without attention to the fallacies, with their emotional tinges, that pursue all study of abstract, generalized terms. And without such ventures into the recorded thought of the world's wisdom, no one can gain an adequate education. The psychology of language and the psychology of emotion, at least for the serious student of education, must become one. The artificial wall between intellect and emotion is penetrated daily in the classroom of the successful teacher.

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[34] P. Witty, "Interest in TV and Success in School," *Educational Administration and Supervision*, XXXVII (1951), 193-210.

[35] C. Laird, *The Miracle of Language* (Cleveland: World Publishing Company, 1953).

[36] S. I. Hayakawa, *Language in Action* (New York: Harcourt, Brace & Company, 1941); S. Chase, *The Tyranny of Words* (New York: Harcourt, Brace & Company, 1938).

[37] See Chapters 5 and 10.

[38] G. W. Allport, *The Nature of Prejudice* (Boston: The Beacon Press, 1954).

Personal affection and social discipline. As indicated in Chapter 5 in the discussion of pupil misbehavior, the teacher sometimes feels frustrated by conflict between a genuine affection for the girl or boy who misbehaves and a duty to maintain order or social discipline. No matter how urgent a learner's concerns, he has no right to trample upon the rights of others. Here a clear interpretation of "democracy" may help, in which the "rights" of the individual and the "rights" of the group are adequately and fairly adjusted. The point is that the psychology of individual differences, of interest, of freedom, seems to point in one direction, whereas the logic of social control points apparently the other way. Here the teacher may need to redefine "discipline" in terms of the members of the class group learning "self-discipline" together and by continuing to explore experimentally in the school and in the community the complex and comprehensive meaning of "democracy."[39] In this exploration the teacher may find it advisable to reach out beyond the customary scope of educational psychology toward a philosophic consideration of democratic values, in which personal affection for individuals and social discipline of the group are reconciled.

Social development and personal values. In the teacher's study of social development two aspects are often emphasized. One is the process of socialization by which the adult generation, chiefly the parents and teachers, induces the growing generation to accept the customs, manners, and moral standards or norms[40] that were in their youth so transmitted to the present generation of adults, albeit with some, usually minor, differences. The consideration of this adult-to-youth acculturation process is often supplemented by the other aspect, namely, the social processes occurring within the peer groups from early childhood to the late teens—child to child, adolescent to adolescent. The basic principles for understanding the adult-youth socialization process are derived largely from the anthropologists' studies of primitive peoples, the sociologists' surveys of current American life, and the social historians' accounts of mankind's struggles for freedom and security. Our understanding of the peer group interactions has been enlarged markedly in recent years by the studies in group dynamics. Both of these general sources have been enriched and made more specific for teachers through studies made by educational sociologists and group dynamics specialists in the schools.

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[39] W. F. Bruce and F. S. Freeman, *Development and Learning* (New York: Henry Holt & Company, Inc., 1942), pp. 97-99.

[40] R. C. Angell, *Free Society and Moral Crisis* (Ann Arbor: University of Michigan Press, 1958), chap. 4.

In contrast, the study of personal values, which may be considered an extension of individual interests and attitudes, tends to reach beyond the biologically and socially influenced selection of particular interests, such as in mechanics, nature study, literature, or the arts, and even beyond attitudes toward certain groups of people, out to *general ideals.* As the school learner matures he may begin to ask in his own words the fundamental question: What is most worthwhile in life? As the learner or the teacher approaches this further end of the interest-attitude-value spectrum, he may realize that he is approaching an area where the ultimate answers cannot be found in the past history of the culture, nor in psychological explanations of the processes of socialization and group dynamics, but require a creative statement of his own philosophy of education and life. Thus, a learner or a teacher develops more fully into a *person* by creating a set of *ideals* of his very own.

Since the teacher, who assumes the roles of daily academic guide, of social disciplinarian, and, by example at least, of philosophic mentor, has only a limited time for influencing the members of his class group, he needs some guideposts to effective action. Shall the teacher resort to the guideposts set up for him by his family in childhood, or those implanted by the successive peer groups of his youth, or those emphasized by his teachers from kindergarten to college? Or, can he use all these sources in making a set for himself? In any case, the teacher becomes aware at this point of the advisability of bridging any gap that may exist for him between two problems: (1) *What* shall we teach youth? (2) *How* shall we teach youth? Relating the "what" and the "how" helps to bring the aspects of social development and personal values into closer affinity.[41]

Development and learning. The reader of this volume will have noticed that this chapter is the final one in the Part devoted to "Growth and Development" and is followed immediately by the chapters grouped in a Part entitled, "Learning." What is the significance of treating separately "development" and "learning?" How shall the practicing teacher *relate* the principles of human development to processes of learning? How does "learning" function in "personal development?" Is such a division in educational psychology essential or does it indicate an immature "compartmentalization" fostered by historic chance? Such questions may suggest to the student of educational psychology his own responsibility for interweaving whatever he "learns" about "development" with whatever "development" he achieves in the understanding of "learning processes."

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[41] W. F. Bruce, "Relating 'What' and 'How' in Teaching," *Educational Administration and Supervision,* XXXVII (1951), 211-222.

Historically, the study of human development was a latecomer in the fields of general and educational psychology. When *Development and Learning*[42] was published sixteen years ago, some educational psychology instructors were still trying to keep the teacher-education curriculum free of the invading "child development" courses. The publication of volumes, such as Preyer's *The Mind of the Child*[43]and Stern's *Psychology of Early Childhood*[44] has at last resulted in attention being given both by general psychologists[45] and educational psychologists[46] to the developmental aspects of human behavior. The educational psychology texts all continue to entitle some chapters "Learning," but vary in number and organization. Whether or not textbook writers find it advisable to integrate their presentations of "development" and "learning," the student of educational psychology and the teacher in the classroom see these two aspects of life operating together in the daily school activities of children and adolescents. Indeed, if the two approaches to education are not seen as interwoven or merged, much of their meaning to teachers will be lost.

In attempting to clarify the meaning of "development," we see that the terms "growth" and "development" are often used together, as in the titles of Chapters 8 and 9 of this volume. And many of us commonly use them interchangeably, as when teachers say in June, "Susan and John have *grown* remarkably this year," for the teachers are including how much this girl and boy have *learned* in the subject areas and *developed* as persons. It may be helpful in tracing the *relations* of "growth" and "development" to quote the distinction drawn by Daniel Prescott:[47] ". . . mental growth means an increase in the elementary *capacities* for . . . learning . . . for understanding the inter-relations existing in reality between the facts experienced. Mental development means . . . the actual increase in comprehension of the interrelations . . . the actual emergence of behavior patterns . . . mental development depends upon the nature and scope of the experiences through which the individual [learner] passes." It appears that the term "growth" is used to emphasize capacity or potentiality, whereas "development" includes the actual abilities as the teacher sees them operating in the learner. The evidence of "capacity to learn" is always the learning that develops. School learning depends upon the growth of the body, including the flexible, muscular hand and the coordinating eyes, the brain cells and the rest of the central nervous system, the endocrine glands that participate so markedly in growth by means of the blood stream and autonomic nervous system. No body—no learning! Development in school or out depends also on appropriate experiences. No experience—no learning! So, although in certain connections "growth," "development," and "learning" carry distinctive meaning, their larger, significant meaning for the teacher is seen in their interrelatedness.

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[42] Bruce and Freeman, *Development and Learning, op. cit.*

[43] W. Preyer, *The Mind of the Child*, H. W. Brown (trans.) (New York: D. Appleton and Company, 1888, 1889), Part I: "The Senses and the Will"; Part II: "The Development of the Intellect."

[44] W. Stern, *Psychology of Early Childhood* (New York: Henry Holt & Company, Inc., 1924).

[45] L. E. Cole, *Human Behavior, op. cit.*, chaps. 4–6.

N. L. Munn, *The Evolution and Growth of Human Behavior* (Boston: Houghton Mifflin Company, 1955).

[46] G. M. Blair, R. S. Jones, and R. H. Simpson, *Educational Psychology* (New York: The Macmillan Company, 1954), chaps. 2–4.

Cole and Bruce, *Educational Psychology, op. cit.*, chaps. 1–7, 14.

Shall we go one step further to incorporate in development and learning their creative aspects? Every time a six-year-old child or a sixteen-year-old adolescent takes a new developmental step in motor skill, mental insight, emotional stability, social perception, esthetic appreciation, or ethical evaluation, it is a *creative act for him.* From a psychological viewpoint, "creativeness" is just the next step of the girl or boy beyond the development and learning of the previous day. The teacher need not restrict the meaning of creativeness to the mathematical genius, to the inventor of a new gadget, to the writer of an original poem, to the composer of a new symphony, to the revolutionary artist, or to the developer of a new ethical philosophy. All these forms of growth, development, and learning are occurring creatively each day in the person we call the learner. An appreciative perception of the *continuous relations* from physical growth in infancy to the greatest achievements of mankind in his twentieth-century maturity may bring to the teacher *creative* impulses in working with youth. The *facts* of sequential development give a sound basis for the *ideal person* the creative teacher envisions in the learner today.

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[47] D. A. Prescott, "Youth as Developing Organisms," chap. 3 in Thirty-eighth Yearbook of the National Society for the Study of Education, Part II (Bloomington, Ill.: Public School Publishing Company, 1939), pp. 34–35.

QUESTIONS AND EXERCISES

for discussion and study

1 Observe a school pupil on the playground for half an hour, classifying the various aspects of his activities as physical, intellectual, emotional, and social.

2 Indicate by diagram and written statement how the several aspects observed are interrelated.

3 Make a similar observation of the same individual or another one in the classroom, again classifying his activities as physical, intellectual, emotional, and social. Choose a period when the pupil has an opportunity to express overtly these several aspects. What aspects do you think are occurring without your being able to observe them? What bearing do you think these hidden aspects have upon the observed ones?

4 Indicate by diagram and written statement how the several observed and hidden aspects are interrelated. Compare your notes on these four exercises with those made by another student in your educational psychology class.

5 In observing a classroom, what do you find the teacher doing to promote mutual support among the several aspects of development? What else do you think might be done for that purpose?

6 Taking a school pupil, whom you know well, indicate how his group life in the family affects his progress in school.

7 Taking the same pupil or a different one, indicate how his peer-group activities outside home and school affect his progress in school.

8 Looking back upon your own elementary- and secondary-school experience, indicate what aspects of your own development you believe were neglected or overemphasized by various teachers. Can you give instances of teachers who helped you balance and integrate your development?

9 Do you believe that it is helpful for a teacher to have in view certain attainable ideals for the learning group? If so, state what the important ones are for an age level of your own choice. If not, what kind of goals would you suggest for the teacher of such a group?

10 What aspects of development should receive more emphasis than they have been given in this chapter? Why?

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IV

LEARNING

CHAPTER 14

Basic learning theory for teachers

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Introduction

WHAT IS LEARNING? How do we learn? What do we learn? These are questions to which almost anyone can give offhand answers. But to the psychologist and educator such answers are generally not good enough. The psychologist, as a scientist, wants and works to get verifiable, explicit, and detailed facts of the condition and circumstances under which learning takes place. He formulates a careful definition of what it is he is gathering facts about. He then organizes these facts into generalizations, principles, theories, and even laws that become a scientific description or explanation of learning. He wants to know all of this as a scientist.

The educator wants the same thing, because his fundamental task is to guide or direct the learning of others so that educational goals or purposes are accomplished. The educator is, in effect, an applied scientist who, on the basis of his knowledge and understanding of learning, can set the conditions and can guide the activities of others so that learning which is contributory to educational goals is most likely to take place.

In this chapter and the seven that are to follow, something of the nature and conditions of learning will be set forth. In this chapter we will approach learning in terms of some of the more fundamental considerations. We will outline and examine some of the theories that have been developed as to what learning is and how it occurs.

Broad groups of learning theories

Theories of learning can be classified into two broad groups: connectionist, or stimulus-response theories, and field theories. Field theories of learning are also sometimes called Gestalt theories, organismic theories, or cognitive theories. The meanings of these terms will be discussed later. There is also what is called a functionalist theory of learning. Functionalism can scarcely be considered a third broad group, because it stands more or less alone.

Connectionist theories. Practically every beginning student of psychology understands the paradigm, $S \rightarrow R$, which is assumed under connectionist theories of learning. The symbols $\mathrm{S} \rightarrow \mathrm{R}$ mean stimulus is connected with or leads to response. We know that the environment contains sources of energy that impinge on the sense organs of living creatures. We call these impingements of energy, stimuli. Light waves impinge upon the eye and we see, sound waves upon the ear and we hear, chemicals upon the taste buds and we taste, and so on. Under appropriate circumstances of such stimulation, the creature—and in educational psychology we are almost totally concerned with human beings—responds or reacts. His muscles contract or his glands secrete. Certain responses seem automatically to follow certain stimulation. We typically call these "unlearned responses." But in learning, responses or reactions that do not normally follow certain stimulation *do* become *connected with* these stimuli. The circumstances under which this comes about is what interests the learning psychologist. When these circumstances are studied and are brought together in some logical, coherent pattern, we have a theory. When these circumstances are brought together as items of data, generalizations, principles, and laws, and have as their central focus the relationships between and among stimuli and responses, and *how* the two are connected, we have theories of learning that are then classified as connectionist or stimulus-response theories.

The simple analogy is often repeated that connections are made in this nervous system between stimuli and responses as connections are made on the telephone lines and the telephone switchboard between the persons making and receiving a telephone call. The nervous system is universally assumed to be the instrument of the human being through which this connecting occurs. In succeeding parts of this chapter we will list and describe in more detail the essential elements of this group of theories.

Field theories. The idea of field theories of learning is perhaps best comprehended by starting with an analogy. We have used the commonplace one of the telephone system with its switchboard to help us comprehend the concept of connectionist learning theories. Hilgard[1] once used the analogies of the soap bubble and the whirlpool as descriptive of field theories. These analogies are probably too simple to be particularly meaningful or enlightening. Perhaps a better analogy is an electronic vacuum tube, or even better, a battery-powered transistor radio. With such a radio we know the radio waves strike a particular part of the apparatus and sound (organized so that it is music or speech) comes to us from the loudspeaker. The radio has a connecting system of electrical circuits, but the important part of the apparatus is in the transistors—tiny bits of a particular metal in and through which energy gets reorganized to take a different form so that the instrument "behaves" by transmitting sound. The essential difference in the analogies lies in the relatively static concept of establishing connections in the telephone system and the dynamic energy transformations in the radio receiver.

Field theories of learning are focused in their concepts on "processes which intervene"[2] between stimuli on the one hand and responses on the other. What is meant by the phrase: "processes which intervene"? Although field theorists have done as much of their research as have other psychologists on rats or other animals, a discussion of the theory that uses terms that are a part of our language in referring to humans and their mental processes is perhaps more useful at this point. The human being is believed intuitively by all of us to have a mind that is controlling to some degree at least, as we act or react. We know; we think; we are conscious; we have purposes; we anticipate; we believe. The field theorist does not ignore these concepts but believes it is necessary to come to grips with them in collecting his data, formulating and testing his hypotheses, and in organizing his material into a learning theory.

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[1] E. R. Hilgard, *Theories of Learning* (New York: Appleton-Century-Crofts, Inc., 1948), p. 14.

[2] Hilgard, *op. cit.* (2nd ed.; 1956), p. 187.

In a word, field theories are basically cognitive. By cognitive we mean that insofar as the human learner is concerned, there is an organization of his perceptions.[3] Stimuli from the environment are not discrete and independent each from the other. And, as the stimuli impinge, we are aware of the fact that we are seeing, hearing, and so forth. These awarenesses are related to previous awarenesses, so that we know for example that we are eating the same food (or almost the same food) or hearing the same music (different music but almost the same music) as on a previous occasion. Likewise, we can anticipate; we can know what is going to follow after. We relate events (stimuli and reactions) in time. We hypothesize means-to-end relationships. We do something because we want something. The word "cognitive" connotes a type of activity in the mind (brain) that correlates with these concepts. The field theorist makes cognition a significant aspect of his theory.

The field theorist looks upon the learner as a dynamic energy system set into an environment that is in turn a complex of other dynamic energy systems. The dynamic system that is the learner is in constant interaction with these other systems. Through this interaction there is change, and those changes that are attributable to the interaction are, in part at least, the products of learning. We would wish to emphasize the word *dynamic*, because the learner is not passive. He is undergoing constant change as a natural process of life. The environment is in turn not static but dynamic. The learner, then, as one dynamic system, is part of the larger system (environment), constantly interacting, hence adjusting, adapting, modifying, changing, or, in short, learning. The changes are lawful, that is capable of being accounted for in terms of generalizations or principles. The descriptions of the lawfulness of these interactions and change become the field theories of learning.

What is the meaning of the word *field* as a modifier of theory of learning? Hartmann has explained the term this way: [4]

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[3] W. S. Verplanck, "A Glossary of Some Terms Used in the Objective Science of Behavior," supplement to the *Psychological Review*, LXIV, No. 6, Part 2 (Nov., 1957), p. 7.

[4] G. W. Hartmann, "The Field Theory of Learning and Its Educational Consequences," in *The Psychology of Learning*, Forty-first Yearbook of the National Society for the Study of Education, Part II. (Bloomington, Ill.: Public School Publishing Company, 1942), p. 166.

> The generalized notion of a "field" within which all events occur is a commonplace in modern physics and astronomy. It has been found equally necessary and enlightening in recent biology, psychology, and sociology, considering these disciplines as representative of the whole domain of organized empirical knowledge or "science." All events in nature—and this statement plainly includes psychological and educational phenomena—always occur within some field, big or little, whose properties and structure explain the localized occurrence that it embraces and simultaneously permit increased control over it. The so-called *inherent* properties of an object are said to be ultimately traceable to forces impinging upon it from the surrounding field which is construed as the effective whole determining the attributes and behavior of the part or parts coming within its influence.

Functional theory. A "functional" theory of learning would scarcely be called theory at all by some psychologists. In the subsequent chapters of this book that deal with learning, the reader will encounter descriptions of research and principles of learning that are almost entirely a part of the body of learning theory, which, if it is to be called theory, is functional. Perhaps the majority of educational psychologists, if forced to a choice of schools or theories of learning, would identify themselves with the functionalists. These psychologists have conducted their research more frequently with humans——children, college students, and adults—rather than with animals as their subjects. They have not vigorously pursued theoretical issues but have most often concerned themselves with limited problems, for example, forgetting, whole vs. part learning, memory, or transfer of training. They have been eclectic in that they take their clues for research or the data from research as they find them, whether or not they seem to fall into a theoretical structure. Typically, they ask a straightforward psychological question—for example, is it better to learn a poem as a whole or by parts, should addition and subtraction be taught together or separately, what is the relation between practice and learning—and they have sought an answer through research. Having gathered their data, they make a generalization about the matter at issue but are not disposed to move much beyond their generalization. The word "functional" itself simply refers to the concept that one set of circumstances is related to another set; that in learning, for example, one set of outcomes has a functional relationship to an antecedent set of conditions. The functional psychologist is interested in knowing this relationship, and, at the moment at least, nothing more. Because the remaining chapters of this "learning" section of this book are largely functional in orientation and content, no further description of a functional theory of learning will be presented in this chapter.

General nature of learning

Before proceeding further it is desirable to state something of the general nature of learning, to state its relation to behavior in general, and to contrast it with maturation (or growth and development).

Behavior. All living creatures seem to be continuously responding. Responding is generally described physiologically in terms of the contraction of muscles or the secretion of glands. We move about; we eat; we drink; our heart beats; we do a myriad of things. We call this activity behavior. Not all behavior is overt, that is, observable. When we read or listen to music we are also behaving. This behavior is the basic datum of the psychologist. He wants to understand it. The learning psychologist, however, is interested specifically in *those changes of behavior that he calls learning.*

Learning and maturation. Changes in the behavior of the human being are ordinarily described under one of these two terms: maturation and learning.[5] Certain changes in behavior can also occur as a result of physiological or anatomical changes. Changes may also result from such things as accidents, drugs, and so on, or deterioration of the body. These latter types of changes, however, have limited, although sometimes important, psychological or educational interest. Changes that are associated with certain changes in body physiology following work are said to result from fatigue.

Those changes that are associated with normal growth are called maturation.[6] Such behavior occurs apart from any specific stimulation from the environment. *Those changes that are associated with specific stimulation are said to be learned.*

In any particular situation, these distinctions are seldom clear-cut. That each child talks, normally saying his first words at eighteen months of age and using phrases by the age of thirty-six months, is generally ascribed to maturation. But the language a child speaks is obviously the result of a specific environment and we say a specific language is learned. Speech is, however, highly complex and complicated behavior, involving not only words and grouping of words, but articulation, voice quality, accompanying gestures, and other body movements. Other changes can occur in speech that result from anatomical or physiological changes in the individual or from fatigue. But they are apt to be recognized as such.

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[5] See the article on "Learning" in the *Encyclopedia of Educational Research* (New York: The Macmillan Company, 1950).

[6] Part Three of this book deals with those changes that occur as we mature (grow older) and which are called growth or development.

Distinctions between behavior that is the result of maturation or of learning might seem to be of only academic or scholarly interest. This is, however, not the case. If the teacher or other applied psychologist understands the complexity of the changes that are occuring as the result of both processes and the interaction between the two, he is not apt to go far astray in his teaching. On the other hand, if he assumes that he can teach something that is actually in large measure the result of maturation he may do actual harm to the individual. Likewise, if he assumes that something cannot be learned because it must wait for maturation when the reverse is the case, he may neglect to teach what should be taught. For example, forcing a child to attempt to learn certain speech patterns before a certain maturation has occured can disrupt the normal development of speech in the child and do damage. On the other hand, failure at an appropriate time to provide specific training in speech may be a cardinal educational error.

Factors associated with learning

People learn, but they also forget. Learning may or may not be useful in new situations. We are all quite sure that whether we want to learn or need to learn makes a difference in whether we learn or not. Each of these sentences deals with an aspect of learning that is recognized to be important in one way or another. Psychologists have been systematic in their concern with these matters and have had something to say about each. A complete and perfect theory of learning would take each of the many factors associated with learning and deal with it in an explicit and precise way. All do not do so. The major factors are, however, here enumerated so that their relevance to learning and learning theory can be clearly discerned.[7]

Ability or capacity. A description of learning must take into account the difference among human beings in their ability or capacity to learn. The various species of animals have different capacities to learn. This is obvious. Man is known to have greater capacity to learn than other living things. However, man cannot learn to swim as well as the fishes or whales no matter how hard he tries; nor can he fly like the birds. Within the species, there are differences in what can be learned. We know men differ in their abilities to learn. One branch of psychology makes a study of these differences. Predictions of behavior, including predictions of learning based upon these differences, are an important part of psychology. When we classify children as feeble-minded, normal, or in the genius class, we are classifying them in part in terms of their ability to learn.

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[7] The concepts that follow in this section are derived from Hilgard, *op. cit.*, (2nd ed.), pp. 7-8.

Motivation. Motivation is a general term that encompasses those states of the individual under which he attends to certain aspects of his environment. As a result, his behavior is both initiated and directed. It is said that motives have an energizing function and a directing function. We use such terms as "need," "want," "interest" to indicate certain aspects or conditions of motivation. These terms, including the term "motivation" itself, are general and do not have precise definitions. We infer these conditions of motivation in terms of the way an individual is reacting. We infer hunger when he eats, or thirst when he drinks. We also infer needs for affection, or interest in science, as a result of individual behavior. Because all human beings tend to display certain behavior under certain environmental conditions, we ascribe certain motives to all persons because they are members of the human race. We say such motives are primary. They include such physiological needs as the need for food, water, and sex activity. Other behavior is more specific and seems to be derived from primary motives. An interest in science, mentioned above, or the love of money would be examples of such motives that are called secondary motives. They are in one sense learned. They are, however, very important in accounting for learning.

How motives are defined and the roles they are presumed to play in human behavior are very important aspects of learning theory. For example, one theory may hold that learning can occur without motivation, another that all learning is motivated.

Purposes or goals. Just as we infer from behavior that a state or condition, which we call motivation, exists as an individual responds, we also infer that as he responds he has an end object or state in mind. This object or state is called a *goal* and he has as his *purpose* the attainment of the goal. Just as hunger is inferred as a motive, getting and eating food is a goal. As interest in science is an inferred motive, reading or hearing about science is a goal. Goals can be immediate or long-range. They can be objects or states or conditions. They can be simple or complex. The term "incentive," although not synonymous with "goal," is in many respects equivalent. It is ordinarily used to specify a goal-object or state which is somewhat explicit. The accumulation of money may be a goal, whereas a specific sum of money is an incentive that is part of the goal.

A part of the development of learning theory is to formulate ever more explicit and more rigorous definitions of these concepts. A second part of theory is to state the relationships between these concepts of goals or purposes and the learning process.

Rewards or effect. All learning theory must come to grips with this type of question: What are the effects of rewarding or punishing responses? On the one hand, there is the concept that sheer repetition of a response can cause it to become learned; on the other, that some sort of reward is essential if a response is to become established. These concepts become theoretical differences. A special term, "reinforcement," is frequently used in contemporary discussion of learning. It refers to the effect of attaining an object or state (goal) that satisfies a motive (need or want) on the establishment of a response.

Practice. "Practice," "exercise," "repetition," or "drill," terms used in everyday speech, are presumed to have something to do with learning. What is the role of practice in learning? Does practice alone result in learning? Does it take practice plus something else to produce learning? Can we learn without repetition? This concept of practice or repetition should be treated with some precision in any discussion of learning.

Forgetting. That we forget is acknowledged by all. Do we forget simply because of the passage of time? Or, is there something actively going on in the individual that accounts for what is properly called forgetting? This is still another aspect of the totality of learning that a complete theory must reckon with.

Transfer of training. It is a generally accepted assumption that responses learned in one situation may be elicited and be appropriate in a new situation. New learning may also be accomplished with greater ease of efficiency because of previous learning. This condition is called transfer of training. How this is accomplished is an item to be accounted for in a theory of learning.

Why more than one theory of learning?

One can very legitimately ask why there are several theories of learning. Why not one theory? As Hilgard said, "All the theorists accept all the facts." [8] Why, then, should there be differences of opinion among learning psychologists? There are several reasons.

First, there must be agreement that a fact is a fact. As psychologists conduct their research, there is seldom if ever any deliberate distortion of data. But populations on which data are gathered may differ. Data are gathered on children, on college students, on adults. Subjects may be dull, average, or bright. Only after findings seem to be established for a variety of populations, can we begin to assume that we have a fact of human learning.

Many psychologists work almost entirely with animals. This research is highly useful, and many fundamental principles could only be established by such research. But other psychologists are not certain that findings based on animal research can be held to be valid, *in toto*, for learning by human beings.

The material learned has significance in determining the nature of the data gathered. It is held by many that learning of nonsense syllables is not the same as learning meaningful material. Learning motor skills may not produce the same kind of data (facts) as learning how to solve a complicated intellectual problem.

Even when facts become firmly established as facts and are accepted by all psychologists, they may be subject to different interpretations. Every person brings his own unique experience to any problem of interpretation. One psychologist will give emphasis to one set of facts, another psychologist will emphasize other data. Perhaps the most important consideration is that not all the facts are in. All of human behavior is exceedingly complicated, and learning is no exception. It will be a very long time until all the data that are important to understand learning are available to us. One can only speculate about the missing data either as he makes decisions in teaching or as he works out a theory. These speculations will differ from psychologist to psychologist and will cause them to form different conclusions.

McConnell [9] made a detailed analysis as to why different theories have arisen. He concluded that these items were important: (1) the different kinds of tasks learned in observational or experimental situations, (2) the different terminology used, with the connotations that these terms have, and (3) the emphasis placed on certain features of learning to the exclusion of other features.

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[8] *Ibid.*, p. 9.

[9] T. R. McConnell, "Reconciliation of Learning Theories," in *The Psychology of Learning*, *op. cit.*, pp. 243-254.

A few psychologists have attempted to resolve the dilemmas presented by these apparent conflicts by postulating more than one kind of learning. Mowrer is a psychologist who has proposed two kinds of learning.[10] One is a kind of learning dependent upon contiguity (association) alone; the other requires reinforcement (effect). Tolman has suggested "that there are really a number of different kinds of learning." He goes on to say that, "it may turn out that theory and laws appropriate to one kind may well be different from those appropriate to other kinds. Each of the theories of learning now current may, in short, still have validity for some one or more varieties of learning, if not for all."[11]

Origins of research and theory

The earliest experiments that began to produce the basic data on which our knowledge and theory of learning rest were conducted by Ebbinghaus in Germany and Bryan and Harter in this country. Ebbinghaus studied the learning of nonsense syllables and drew the first curves of learning and forgetting. Bryan and Harter studied the learning of telegraphic language and identified many of the characteristics of learning curves that are as valid today as they were almost sixty years ago when the studies were made. They identified among other things the irregularity of the learning curves and "plateaus." Also, before the turn of the century, Thorndike, whose work will be discussed in more detail later in this chapter, was doing experimental work on learning with animals as subjects.

Conditioning. It was the work of the Russian physiologist, Pavlov, which has become known as conditioning, that gave the major impetus to theory-building in learning. The essential elements of the classical conditioned-response experiment are well known. A reaction that normally follows a specified stimulus is selected. It is assumed that this stimulus-reaction is a part of original nature or unlearned. A new stimulus is now presented in association with the original stimulus After a time, when the original stimulus is withdrawn, it is found that the new stimulus now elicits the original response. The response has now become *conditioned* to the new stimulus.

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[10] Hilgard, *op cit.* (2nd ed.), pp. 413-414.

[11] E. C. Tolman, "There Is More Than One Kind of Learning," *Psychological Review*, LVI (1949), 144-155; reprinted in L. M. Stolurow (ed.), *Readings in Learning* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1953), pp. 62-77.

Psychologists have studied the conditioned-response type of learning in great detail.[12] In Pavlov's classic experiment he conditioned the flow of saliva in a dog to the ringing of a bell. Other forms of behavior that have been conditioned include the knee-jerk reflex, winking, the pupillary reflex, pulse changes, pitch of voice, gastric secretion, and the taking of food in newborn and older children. It has been found that the time relationship between the unconditioned and conditioned stimulus is a critical factor. Ordinarily the conditioned stimulus should precede the unconditioned stimulus. A second important factor is that of reinforcement. After a conditioned stimulus-response reaction is established, if it is not reinforced with the unconditioned stimulus from time to time, the response will weaken and disappear. It has also been found that new unconditioned stimuli can be conditioned to a conditioned stimulus. That is, if B is conditioned to A, then C can be conditioned to B.

The most important contribution of conditioning has been to give us basic scientific data on which to begin to build a theory of learning. Hull's theory, which will be discussed later, is derived directly from conditioned-response data.

Now let us turn to descriptions of two stimulus-response theories of learning: Thorndike's connectionism and Hull's drive-reduction theory.

Thorndike's connectionism

Edward Lee Thorndike (1874–1949) is generally considered to have been the foremost educational psychologist not only of the United States but of the world. He contributed to research and theory in the field of learning and to the fields of genetic psychology (individual differences), testing, and social psychology. He also made fundamental contributions to the psychology of reading and arithmetic.[13]

Thorndike first stated the elements of his theory of learning in

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[12] E. R. Hilgard and D. G. Marquis, *Conditioning and Learning* (New York: Appleton-Century-Crofts, Inc., 1940).

[13] The beginning student in educational psychology should realize that the summaries of the various learning theories presented in this chapter represent in just a few pages what is often the major portion of a man's life work. To know

1913.[14] That connections are formed in the nervous system between stimuli and responses is basic. These connections formed are illustrated by the symbols, $S \rightarrow R$. Another word used to describe these connections is the word "bonds." Thorndike's theory is sometimes called a *bond theory of learning*. Thorndike has written, "Learning is connecting. The mind is man's connection system."[15] When and how this is accomplished was stated first in three laws: the laws of readiness, exercise, and effect.[16]

In the law of readiness, Thorndike stated: "When any conduction unit is ready to conduct, for it to do so is satisfying. When any conduction unit is not in readiness to conduct, for it to conduct is annoying. When any conduction unit is in readiness to conduct, for it *not* to do so is annoying."

The laws of use and disuse are subsumed under the law of exercise. The law of use reads: "When a modifiable connection is made between a situation and response, that connection's strength is, other things being equal, increased. . . ." The law of disuse is stated thus: "When a modifiable connection is *not* made between a situation and a response during a length of time, that connection's strength is decreased."

Thorndike stated his law of effect in these words: "When a modifiable connection between situation and response is made and is accompanied or followed by a satisfying state of affairs, that connection's strength is increased. When made and accompanied or followed by an annoying state of affairs, its strength is decreased."

Thorndike modified his position in the early 1930's as a result of research he himself conducted. At this point, he placed much less emphasis on the law of exercise and gave much greater emphasis to the law of effect. Thorndike concluded, as a result of the type of experiment cited in Chapter 1,[17] that exercise in and of itself did not result in learning. Repetition simply supplies the circumstances under which the law of effect can work.

The law of effect. When a connection in the nervous system between a stimulus and response is followed by a satisfying state of affairs, the

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all about a single learning theory would often require the reading of research monographs, dozens of journal articles, and perhaps several books produced by a single man.

[14] E. L. Thorndike, *Educational Psychology*, Vol. II: *The Psychology of Learning* (New York: Teachers College, Columbia University, 1913).

[15] From *Human Learning*, by Edward L. Thorndike. Copyright, 1931, The Century Co., p. 122.

[16] Thorndike, *Educational Psychology*, *op. cit.*, pp. 1-5.

[17] E. L. Thorndike, *Human Learning*, pp. 8-15.

connection is strengthened. Thorndike de-emphasized the effect of an annoying state of affairs, saying that annoyers do little or nothing to cause a connection to be weakened or eliminated. The nature of a satisfying state of affairs is an all-important consideration. At one time, satisfaction was associated with pleasure and dissatisfaction with pain, but this relation is not now held by Thorndikian psychologists or others. A satisfying state of affairs has been described as that condition which causes a connection to be formed. This has been called a circular definition in that a satisfier causes a connection to be formed, whereas a satisfier is defined in terms of connections formed. However, the dilemma is solved in another way. The way is to determine by empirical observation or research what it is that serves as rewards or satisfiers and hence are effective in causing connection or bonds to be formed. In this way there is no theorizing but simply empirical testing. For this reason, Thorndike's law of effect has been called *The Empirical Law of Effect.*

The strengthening influence upon a connection is known as a *confirming reaction.* Thorndike did not profess to know the physiological processes or what happened in the neurons as a result of the confirming reaction. He did, however, make this explanation:

> The confirming reaction is independent of sensory pleasures; indeed a pain may set it in action. The confirming reaction, though far from logical or inerrant, is highly selective. It may pick out and act upon the words one is saying, leaving uninfluenced one's posture and gross bodily movements and all that one is seeing. The confirming reaction seems often to issue from some overhead control in the brain, the neural basis of some want or "drive" or purpose or then active self of the animal. This overhead control may be rather narrow and specific, as when a swallow of liquid satisfies thirst. . . . It may be very broad and general, as when the purpose is to do well and win a game or to pass the time pleasantly. . . . It may be stimulated to send forth its confirming reaction by a rich sensory satisfier, such as freedom, food, and companionship . . . or by a symbolic satisfier, such as the announcement "Right" in an experiment in learning.[18]

Insofar as education is concerned, there are two irreducible minimums in connectionism. First, the "bonds to be formed" must be identified. Second, the right responses must be elicited and rewarded. Practice under conditions of appropriate reward is the *sine qua non* of learning.

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[18] E. L. Thorndike, *Human Nature and the Social Order* (New York: The Macmillan Company, 1940), pp. 15-16.

The concept of identification of bonds to be learned has led in education to detailed analysis in the various school subjects of the items (facts) or skills to be learned. In arithmetic, for example, each of the one-hundred addition facts (from 0+0 through 9+9) is to be studied in isolation from all the others, that is, practiced and rewarded. The names, dates, events of history are to be identified as such. The 1,000 or 10,000 most frequently used words in reading are identified and then used over and over again in reading material.

For almost half a century, a connectionist psychology has been the dominant one in school practice. It is, however, now being modified and reformed in terms of other theories that have emerged since Thorndike's connectionism. They will now be discussed.

Hull's theory of learning

Hull's theory of learning has two highly significant characteristics. First, it is what scientists would call the most "elegant" theory of learning presented to date. Second, it is a "drive-reduction" theory. These characteristics are substantively different, and each will be briefly described.

Nature of a theory. Clark L. Hull made a greater attempt than any other psychologist to work out a theory that would meet the tests of criteria that would characterize an ideal theory. In his most important book, *Principles of Behavior*,[19] Hull's first chapter is titled "The Nature of Scientific Theory."

Hull has stated in this chapter:

> . . . a theory is a systematic deductive derivation of the secondary principles of observable phenomena from a relatively small number of primary principles or postulates. . . . In science an observed event is said to be explained when the proposition expressing it has been logically derived from a set of definitions and postulates coupled with certain observed conditions antecedent to the event. This, in brief, is the nature of scientific theory and explanation as generally understood and accepted in the physical sciences after centuries of successful development.[20]

Hull, as does modern science, recognizes two components that make up theory: data acquired by observation and interpretation of data.

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[19] From *Principles of Behavior*. Copyright, 1943, D. Appleton-Century Co., Inc., pp. 2-3.

[20] *Ibid.*, pp. 2-3.

Data can be gathered by the most casual of observations or with great rigor from the most carefully designed controlled experiment. Science puts a premium on the latter. Interpretation can also be most casual or it can meet the most rigorous tests of logical thought. The latter requires careful definition of terms, stating basic assumptions as postulates, and the derivation of theorems through deductive logic.

Hull's theory conforms to these requirements of science and logic to a greater degree than any other. In this sense his theory has "elegance."

Drive reduction. Hull's theory of learning is a *drive-reduction theory*. Hull begins with the assumption that as a part of the process of living, the organism finds itself in disequilibrium with its environment, that is, it finds itself deprived of something it needs. This may be, as an example, the physiological need for food. Drive then becomes the "tension state" associated with the need. Drive causes the organism to become active, that is, it is *energized*. This activity produces its own stimuli and its own responding. In the process, an object, state, or condition is attained that reduces the drive by satisfying the need. The word used to define this final process is reinforcement. The reinforcement of a response causes it to be learned.

Elements of Hull's theory. Hull's theory is a stimulus-response theory. Since only the stimuli and response in a situation are observable, Hull postulates what are called intervening variables or symbolic constructs. In its most elementary form the schemata of the total learning situation-process is as follows:

A stimulus (S) impinges on the organism.[21] This results in a neural impulse. If there are two or more stimuli, there will be neural interaction. The neural impulse leads to a reaction (R). For this to occur, however, drive (D) is assumed to be present. Drive is a tension state resulting from a need. If the reaction (R) reduces the drive (D), we have the condition of reinforcement (G). The reinforcement brings about an organization in the nervous system known as a habit (sHr).

Hull however postulates these additional symbolic constructs. It is assumed that the organism has a potential for reaction (called reaction potential or sEr) and that this reaction potential is not a constant but varies from moment to moment (oscillation or *sOr*). This accounts for the fact that a response or reaction to a stimulus is not always forthcoming or that it varies in strength. Likewise, as the organism reacts, work is done. If the reaction is not reinforced, as a result of changes in the organism following work the reaction is inhibited. This is known as experimental extinction and accounts for the dropping out of reactions (no learning).

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[21] This and the succeeding paragraph are derived from Hull's summary of his theory presented in his book, *Principles of Behavior* (*op. cit.*), pp. 383 ff. It follows, however, the form used by Hull, with the symbols used by him to identify some of his important concepts.

Two additional considerations of importance are primary and secondary reinforcement. When a response results in the reduction of a need, we have a condition known as *primary reinforcement.* However, as Hull writes, "Careful observation and experimentation reveal, particularly with the higher organisms, large numbers of situations in which learning occurs with no associated primary need reduction."[22] We have used food as an example of a reinforcing agent for the hunger drive. Yet it is not until food is eaten and perhaps digested that the need is reduced. It would therefore seem that reinforcement occurs before the hunger is actually satisfied. Or, perhaps better understood, money can be a reinforcing agent although it reduces no primary drive. This is assumed to be the case because money is associated with, among other things, the securing of food. Consequently we accept the concept, which has been experimentally verified, that the reinforcing agent may be a situation "involving a stimulus aggregate or compound which has been closely and consistently *associated with* the need reduction."[23] This is called *secondary reinforcement* and is recognized by Hull and others to be of very great importance, particularly in human learning.

Although a stimulus seldom if ever exactly reoccurs, we react as if it did. Hull accounts for this with the principle of stimulus generalization. When a stimulus and a response become connected through reinforcement, the response also becomes connected to other stimuli that lie on a "stimulus continuum." The stimuli that now evoke a learned response belong to the class of the original stimulus either in intensity or quality.

Hull's theory is of the same class as Thorndike's. As has been stated, however, it is more elegant—that is, it is more precise and refined. It would seem to give greater emphasis to motivations, particularly as these are related to basic and acquired needs of the organism. The law of effect, which is simply an empirical law with Thorndike, becomes related to the concept of need and gives to one who would guide or direct learning a rationale for the "rewards" that seem so fundamental in bringing learning about.

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[22] *Ibid.*, p. 387.

[23] *Ibid.*, p. 387.

Perhaps the greatest contribution that Hull's concepts can make to contemporary education is the rationale it provides for associating classroom activity with the needs of children. The modern school curriculum is presumed to harmonize with human need, and classroom activities find their meaning in their relation to things that children as human beings do. Hull says learning occurs because a need is satisfied either directly or indirectly. Hence, modern education in some respects finds in Hull a theoretical base.

But what of meaning in education? Are men simply mechanical robots. Or, do they have purposes? Do they have understanding? Education which is simply training does not seem to be education. Perhaps the educator can find some help on these matters by looking at two representative field theories of learning.

All of field theory is developed on the basic assumption that an organizing principle is at work in governing the behavior of living organisms. The more detailed nature of field theories will be explored by discussions of classical Gestalt psychology and the cognitive-purposive theory of the American psychologist, Tolman.

Gestalt Psychology

Gestalt psychology began with the work of German psychologists who were studying the nature of perception. Wertheimer is generally considered to be Gestalt psychology's founding father. We are all now well aware that the "moving picture" is not a moving picture at all but is a series of still pictures. The reality of the still pictures as flashed on the "movie screen" becomes our perception of moving pictures. "The focal point of [Wertheimer's] theory is the fact that when two optical stimuli are perceived by the human eye in quick succession, the reaction is one of simultaneous patterning." [24] Wertheimer called this the Phi phenomenon. The authors of this sentence just quoted also write, "Perception now has been demonstrated as being, not a series of optical stimuli, but a process requiring a physiological correlate apparently existing in the cortical process of the brain." [25]

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[24] L. P. Thorpe and A. M. Schmuller, *Contemporary Theories of Learning* (New York: The Ronald Press Company, 1954), p. 207.

Out of these observations of perception there emerged certain principles that have implications for the general nature of learning. One principle is that the human mind gives an organization or pattern to the environmental world revealed to the organism through sense perception. The mind is not just a connecting system but a transforming system. Thinking back to our analogy of a transistor radio, it was said the transistors transformed radio waves into something else—sound waves. Without stretching the analogy, it can be said that the mind (nervous system, including the brain) does something to the stimuli from the environment. Responses are not mechanically automatic because connections have been formed but are adaptive and "good" because the mind gives an organization or meaning to the stimuli of the environment.

The German word "Gestalt" has as satisfactory English equivalents the words "pattern" or "configuration." In classical Gestalt psychology, the larger environment, although dynamic, is constantly achieving organization. A living organism, although in a sense self-contained or functioning semi-independently, is able to achieve equilibrium with the larger dynamic environment because the organism has the capacity and the force (by virtue of being a living organism) to accommodate to the environment. In other words, organization and reorganization are constantly occurring in the organism as it interacts with its environment. This activity of organization and reorganization of the organism has as one of its manifestations those changes in its responding that we call learning.

Insight. The word "insight" is used more frequently than any other to describe what is occurring in the organism as it is responding and learning. About the time of World War I, on the island of Tenerife, Köhler, another German Gestalt psychologist, conducted experiments in which apes learned in problem situations.[26] Typically, he would place an ape in a situation where it had to secure a banana (food) by piling boxes to reach the banana or by joining sticks together to reach outside its cage and drag the banana to it. The animal had to select an indirect way to solve a problem or reach a goal when the direct way was barred. Köhler used the term "insight" to describe the learning of his apes. He set up as "the criteria of insight the appearance of a complete solution with reference to the whole layout of the field."[27] Köhler found that his apes did solve their problems and that they solved them not through blind trial-and-error but through perceiving the total situation and reacting "insightfully" to it.

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[25] *Ibid.*, p. 208.

[26] K. Köhler, *The Mentality of Apes* (New York: Harcourt, Brace & Company, 1925).

In a more technical sense, the criterion of insight is "the sudden grasping of the solution which results in a process that runs its course in accordance with the nature of the situation, so that the complete solution takes place with reference to the configuration of the field of perception."[28]

The whole and its parts. A further concept important in Gestalt psychology is that *the whole is greater than the parts.* In stimulus-response theories, there is the implicit assumption that both stimuli and responses can be analyzed and reduced to basic elements. In conditioned-response experiments, for example, an unconditioned stimulus is isolated and selected as one with which another isolated stimulus is to be associated. The response that follows the unconditioned stimulus and which is to be attached to the conditioned stimulus is looked upon as a relatively unitary and isolated response. Both stimuli and responses may be linked in chains or may occur simultaneously as a complex, but the assumption is that they are additive. The Gestaltists disagree. Considering largely the complex of stimuli, they hold that they are not additive in that the complex has properties not found in summing the properties of the individual stimuli. The stimuli are patterned or organized, and this organization provides properties of its own. In other words, the whole is greater than its parts.

Gestalt psychology's contribution to education lies in its concepts of the organization of stimuli and of insight. The world of the classroom in which the child is living and learning is not just a body of discrete stimuli, nor are his responses to it those of trial-and-error adaptions. The world is organized; it has meaning. The child can react with understanding; he has insight. Arithmetic is not isolated facts but a system of numbers. History is not names and dates but the sweep of events through time, with one thing leading to or following another. The child can respond to 3 × 4 because he can add three fours. The senior-high-school student can relate the insecurity of the depression years to the enactment of social security laws. Learning is meaningful. So say the educators, and so says Gestalt psychology.

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[27] *Ibid.*, p. 198.

[28] K. Koffka, *The Growth of the Mind* (New York: Harcourt, Brace & Company. 1928), p. 214.

Tolman's purposive psychology

Just as Hull has made more precise the same psychological concepts that are basic to connectionism, Tolman has given greater order and precision to Gestalt concepts. It has been hard for many persons to accept a connectionist or even drive-reduction concept of learning because of its seemingly purely mechanistic character. It appears to leave out that which everyday experience confirms as being most significant about human behavior; that is, that it has purpose. Tolman has come to grips with this problem and has developed a theory of learning that puts purpose or "striving toward a goal" at the heart of it.[29]

Cognitive structure. In stimulus-response theories it is held that what a learner learns is a series of movements. These movements are connected to stimuli either by association in time and space (contiguity) or by reinforcement. In Tolman's theory, however, it is not a series of movements that are learned but signs or expectations. Movements in successive circumstances can never be assumed to be identical. The learner perceives the nature of the situation and responds in terms of these perceptions. These perceptions are assumed to have their neurological correlations, but their nature is now unknown. However, Tolman and others have a phrase to express the concept that somewhere in the neurological structure there is a correlate to the perception of the signs, expectations, and goals. The phrase, "cognitive structure," is still intangible in that it is not yet explicitly described. It is, however, an inference based on behavior.

A molar theory. Tolman's theory is *molar*, in contrast to *molecular*. By molar, it is simply meant that its concepts are larger and more comprehensive in nature and scope than those of stimulus-response theories, which deal with smaller units. The concept of the atom in physics is molecular; that of the solar system, molar. Whereas stimulus-response theorists tend to analyze and reduce behavior to its minimum elements, Tolman deals with the patterns, the larger masses of behavior. He states that these larger concepts connote properties of behavior that will never be revealed by making a molecular approach to behavior. In this sense, Tolman's concepts are analogous to the Gestalt concept that the whole is more than the sum of its parts.

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[29] The basic reference for Tolman's position is: E. C. Tolman, *Purposive Behavior in Animals and Men* (New York: The Century Company, 1932). A detailed summary can be found in Hilgard, *op. cit.* (2nd ed.).

Sign learning. It may be asked in what respect Tolman's position on purpose differs from Hull's concept that the learner responds to satisfy a need. Both psychologists accept the view that behavior occurs as a result of a need; but whereas Hull finds a response being reinforced, hence learned, by need reduction, Tolman finds a response being learned in terms of the learner's perception of the stimuli. For Tolman, the stimuli take on a meaning as the result of their perception by the learner; hence they become a "sign" that behavior will lead to a goal (satisfy a purpose). But the response is learned in terms of the "sign." Tolman has borrowed from the Gestalt psychologists the concept that the stimuli are patterned or organized. He has consequently used the phrase "Sign-Gestalt learning" to categorize his theory.

Tolman's theory is, like Hull's, a behavior theory. Although it recognizes purpose, it is not a mental-state theory. Tolman's basic data are responses made by the learner in a stimulating situation. This is why it can be called a theory of behavior. But Tolman's interpretations are important The behavior of those who are learning, according to Tolman, does not show a blind, mechanistic series of movements or other responses but rather that an intelligence is at work. Mechanistic theories would lead to the inference that the learner seemed not to be playing any part in his learning. It might be implied that the learner is simply a victim of his needs and the stimuli that impinge on his sense organs. Tolman would say that the learner is an active participant in the process. Through the processes of his brain, albeit that the nature of these processes are still unknown, the learner organizes the stimuli, attaches meaning to them, and responds accordingly.

Educators have not made a systematic analysis of the applications to their work implied in Tolman's theory. Yet it is obvious that there is a great affinity between Tolman's position and what teachers do. Teachers do not use such phrases as "cognitive structures," "Sign-Gestalts," or "molar behavior." Yet they operate in complete harmony with the meaning of these concepts. As they teach, they will say, "What does this mean or signify?" "what would you expect?" or even the single word, "Think!" Perhaps the problem-solving types of activities that are often felt to be the best types of "learning experiences" are highly valid under a purposive psychology of learning.

Applications to instruction

Having dealt with four theoretical positions in the field of learning, must we conclude that they are only of academic interest? It will be recalled that we have said that Thorndike's connectionism has had profound influence on educational methods. Although the other theoretical positions have had much more limited effect on classroom practice, they have not been without influence. It is perhaps fair to say, however, they have not been exploited for their full implications for classroom teaching or curriculum development.[30] How theoretical points of view may be translated into different practices in the teaching of arithmetic and their resulting effects upon achievement has been reported by Swenson and was described in Chapter 1.[31]

A similar investigation was conducted and reported by Anderson.[32] He conducted an experiment in which two groups of children learned arithmetic by two methods of teaching, a "drill" method derived from a connectionist theory and a "meaning" method derived from a field theory of learning. The pupils were enrolled in the fourth grades of eighteen Minneapolis schools. Anderson has described the two methods of teaching as follows:[33]

> The drill theory has the following characteristics: (a) Arithmetic is analyzed into a great many units or elements of skill. These units or elements are thought of as being comparatively separate and unconnected. (b) The pupil is to master these elements as relatively discrete acts of skill which need not be understood by the pupil as belonging to a logical system of numbers. (c) The pupil is to master these elements in the forms in which they are most efficiently and effectively used by the adult. (d) The pupil will learn these elements most efficiently and most completely through formal repetition.

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[30] G. L. Anderson, "Theories of Behavior and Some Curriculum Issues," *Journal of Educational Psychology,* XXXIX (1948), 133-140.

[31] Chapter 1, p. 3.

[32] G. L. Anderson, "Quantitative Thinking As Developed Under Connectionist and Field Theories of Learning," in *Learning Theory in School Situations* (University of Minnesota Studies in Education, No. 2 [Minneapolis University of Minnesota Press, 1949]).

[33] *Ibid.,* p. 41.

> The meaning theory, on the other hand, has these characteristics: (a) Arithmetic is a closely knit system of ideas, principles, and processes. (b) This system has an organized, logical structure which can be understood by the pupil. (c) Learning in arithmetic consists in understanding number relations and the mathematical significance of quantitative situations. Understandings of the number system may be called generalizations. (d) Drill or repetition is recognized as valuable for increasing proficiency in arithmetical situations after understanding has been developed or generalizations have been made.

Three hundred seventeen pupils were taught by the drill method and two hundred fifty-eight pupils were taught by the meaning method. Appropriate controls were set up to assure equivalency in learning except for that associated with the method. The experiment was conducted over a period of seven months. A detailed testing program was administered to evaluate the learning during the course of and at the end of the experiment.

This experiment is not being cited at this time to establish that one learning theory is superior to another. It is presented to illustrate that different theories have different practical application to schoolroom learning. However, the results are of significance. Anderson did not find clear-cut differences in the outcomes of instruction under two learning theories. He did find the drill method making greater contribution to pupils who were of initial limited ability but of high relative achievement. The pupils who were of higher ability but low achievement seemed to profit more from the meaning method. McConnell concluded, in his introduction to the monograph in which the study is reported, that the "investigation may . . . add strength to the hypothesis that certain learning theories are more complementary than mutually exclusive."[34]

Some common principles—a summary

McConnell took the same position as that just quoted above in the Forty-first Yearbook of the National Society for the Study of Education.[35] In this discussion he held that, although there are differences among the theories, there are also points of fundamental agreement and that common principles can be found. In the section that follows we discuss four key ideas about learning: (1) learning is both complex and organized, (2) motivation is an essential feature of learning, (3) response made as we learn can be on a continuum from the random to the insightful, and (4) learning involves processes in which responses are both discriminating and generalized. Following a brief discussion of each of these ideas we quote those relevant principles that McConnell has stated in his Yearbook chapter.

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[34] *Ibid.*, p. 5.

[35] McConnell, *op. cit.*, pp. 256-279.

Learning in terms of either stimulation or responding is both complex and organized. This is true whether we think of learning in terms of *S*→*R* bonds or Sign-Gestalts. Although the psychologist, as a scientific experimentalist, may study or attempt to study a specific stimulus and a specific response, he also finds it essential to account for complex behavior. The *S*→*R* psychologist talks about "chains" of responses; he does not deny that in some fashion an organization is achieved. Hence, we may conclude with McConnell:

> 1. Both situation and response are complex and patterned phenomena.
> 2. Descriptions and intepretations of learning, as of all aspects of behavior, must be made in terms of the mutual relationships among events rather than in terms of independent properties or actions of the parts.

Motivation is an essential feature of learning. On the one hand, it involves need and, on the other, a goal that, if attained, satisfies the need. Although theoreticians may argue about the specific role needs and goals play in the learning process, few would deny the significance of motivation. Hull may say that attaining a goal causes the response that leads to it to be learned. Thorndike may say that he does not know what causes a reward to be a reward, but that rewards are important. Tolman may say that reaching the goal simply confirms the expectancy that the stimulation carries, but he does say that behavior and learning are purposive. It seems clear, then, that motivation cannot be ignored as a fundamental part of the learning process. These principles are justified:

> 3. The organism must be motivated to learn.
> 4. Responses during the learning process are modified by their consequences.
> 5. Motivation is the direction and regulation of behavior toward a goal.

Do we learn by trial-and-error or is learning basically insightful? This might seem to be a point of fundamental conflict between Thorndike and Gestalt psychologists. But differences perhaps are intensified because of the nature of the learning tasks set in the experiments of the respective psychologists. If subjects are learning nonsense syllables, there is little opportunity for insight. Some material that has to be learned, even in school, has little inherent meaning and little relation to other material. Katona[36] has studied the learning of material of various amounts of organization and has shown that learning may be on a continuum from sheer rote memorizing to a high degree of organization. Hilgard has presented the idea of the *provisional try* to describe the learner's reaction to a situation.[37] This concept avoids the dichotomy of either trial-and-error or insight. The learner does the best he can in a situation. If the situation presents no clues for a choice, it is a trial and may be an error. If there are clues, the try may be such that it is called insightful. We are thus in a position to accept the following:

> 6. So-called trial-and-error behavior might be more appropriately described as a process of "approximation and correction" or of "trying this-and-that lead to the goal."
>
> 7. Learning is essentially complete (except perhaps for attaining greater precision or reaching a given level of performance) when the individual has clearly perceived the essential relationship in the situation and has mastered the fundamental principle involved in the concrete problem.

All theorists start with the specificity of learning but provide somewhere for its generality. Learners do discriminate; they do generalize. No psychologist denies that transfer occurs. Thorndike talks of transfer through identical elements. Hull has his concepts of stimulus generalization and stimulus compounds. Discrimination and generalization are key concepts in field theory. We then conclude our list of principles with these two:

> 8. The transfer of learning from one situation to another is roughly proportional to the degree to which the situations are similar in structure or meaning.
>
> 9. Discrimination, as well as generalization, is an essential aspect of effective learning.

This chapter has been intended as an introduction to the psychology of learning. Study of succeeding chapters will enrich the understandings that have begun to develop here.

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[36] G. Katona, *Organizing and Memorizing* (New York: Columbia University Press, 1940).

[37] Hilgard, *op. cit.* (2nd ed.), p. 470.

QUESTIONS AND EXERCISES

for discussion and study

1. In your opinion, can a "science of behavior" ever be achieved?
2. If teaching is an art, can a science of the psychology of learning be useful to the teacher?
3. Discuss the pros and cons of the proposition that a teacher should understand theories of learning.
4. Make a list of ten behaviors that you believe are the result of maturation and ten that you believe are learned. Compare your list with that of other students.
5. Secure an elementary geometry textbook and make a study of it as a model of logical development. What are the differences among axioms, postulates, theorems, corollaries, and propositions?
6. What does the word "empirical" mean to you? Consult a dictionary to help you formulate a statement of its meaning.
7. Someone has said that "learning" is a physiological process just as is digestion or breathing. Why should this statement be made?
8. Do you believe that differences in ability to learn will ever be found to lie in the body's chemistry? Why should this question be asked?
9. Criticize the maxim: "Practice makes perfect."
10. What do you believe to be the meaning of "meaning"?
11. Recall incidents from your own learning in which you believe "insight" was and was not manifest.
12. Criticize the maxim: "Spare the rod and spoil the child."
13. Do you believe the same principles of learning can apply to learning to play golf and learning college algebra?
14. Speculate as to why the theories of learning described in this chapter seem to say so little about reasoning, thinking, or problem-solving.

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CHAPTER 15

Nature and conditions of learning

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GEORGE PEABODY COLLEGE FOR TEACHERS

THE LEARNING PROCESS is best understood by noting the changes that are most obviously expressed in intellectual and motor efficiency. Intellectual efficiency is demonstrated when the learner is able to recall information, to apply principles to new situations, or to interpret information. Motor efficiency is evident in the ease with which a task is performed, speed and accuracy being the principal criteria.

Learning is also expressed by attitudes formed, by interests stimulated, and by appreciations developed. It is relatively easy to measure the changes that are expressed by intellectual efficiency and motor skill. It is more difficult to measure reactions that are associated with attitudes, interests, and appreciations. They are, however, important evidences of learning.

Three elements are emphasized in a learning situation: (1) the learning material, which can be selected and organized for presentation; (2) the response to the learning material, which can be measured by testing situations; and (3) the *process* of learning, or what takes place between the point of presenting the material and the learner's response. This *process* is important if the teacher's effort in guiding learning is to be helpful. In most classroom situations, however, there is no precise way of knowing how the learner studies or the mental processes involved in meeting requirements. Thus, measurement must necessarily play a large part in a study of the learner's progress. The manner in which tests are planned determines the techniques used.

Techniques of studying learning

During recent years, research workers have been concerned with the need for making their findings applicable to school conditions. For this reason, they have conducted studies in school settings, using typical courses and subject matter. Techniques for measuring gain in these situations may be classified as those that measure *indeterminate gain,* and those that measure *determinate gain.*

Indeterminate gain. In using the technique of indeterminate gain we obtain a measure of present status—the individual's performance at a given time. This technique is illustrated by the wide use of measurement surveys of school achievement. One of the most frequently observed kinds of evidence is to be found in differences in scores on tests administered to different age and grade groups. In one survey an investigator calculated the percentage of pupils in grades four to twelve who were familiar with the meaning of five concepts in social science. The results are presented in Fig. 15-1, which indicates that as pupils advance from the fourth to the twelfth grade greater numbers are capable of recognizing concepts such as *strike*, *industry*, *premier*, *power*, and *exploit.*

In using this technique there is no precise way of knowing how far the learner has advanced within a given period, because there are no beginning points to mark off his progress. Neither do we know whether he has made regular or irregular progress up to this time. The technique provides a measure of the status of the different age or grade levels under existing conditions, and affords a means of comparing the performance of individuals or groups.

Determinate gain. A more refined technique than that of one measurement of different individuals or groups is that of repeated measurement of the same individuals over a period of time. Figure 15-2 shows changes in scores of pupils in *reading, arithmetic,* and *spelling* during a five-year period. There is marked improvement in achievement in these subjects as pupils advance from the lower to the higher educational levels, measurements being taken of the same pupils at the end of each year.

One of the striking features of this study is that it was possible to show increments over an extended period of time. Repeated measurements made it possible to gain insight into the rate of progress from one testing period to another. It is a *moving treatment* as contrasted

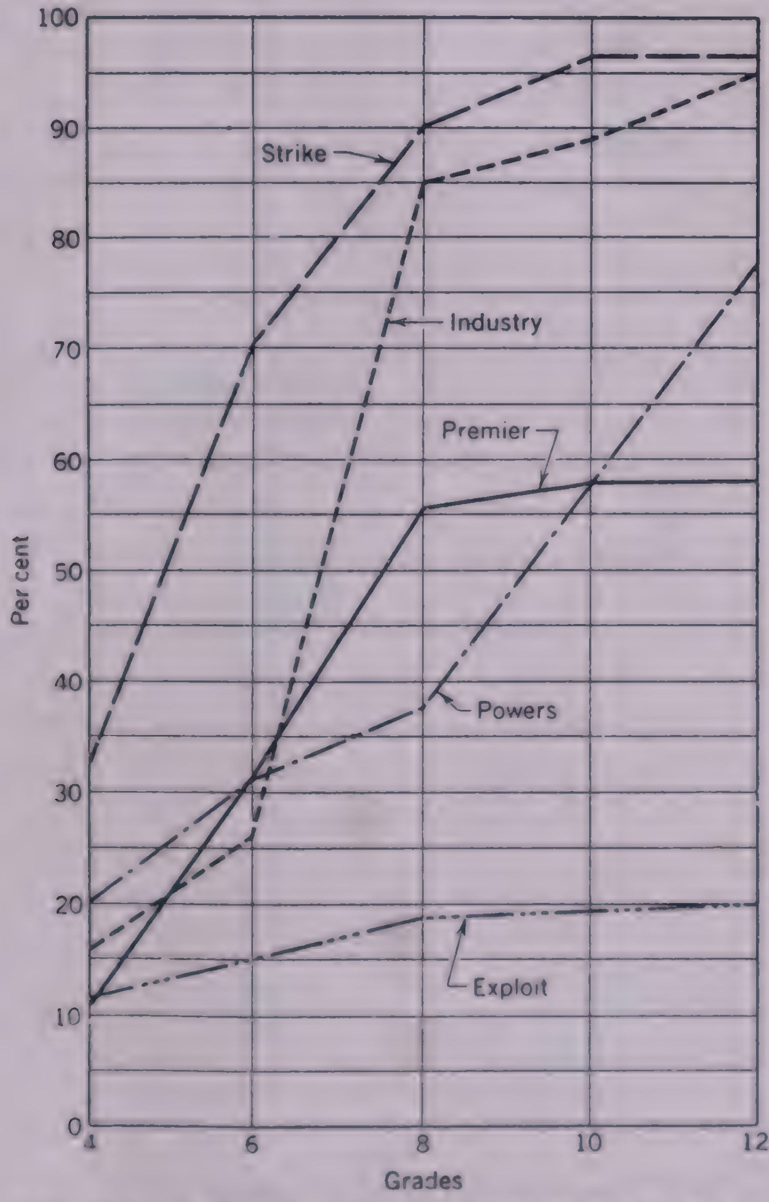

Fig. 15-1. Percentages of pupils in grades 4 through 12 who recognize the meaning of five concepts in social science. From S. L. Pressey and F. P. Robinson, Psychology and the New Education *(Rev. ed.) (New York: Harper and Brothers, 1944.)*

with the static kind of situation illustrated by the technique of *indeterminate gain.*

In more informal classroom situations, use is frequently made of the technique of using two or more testing periods as a means of measuring gain. The first testing, for example, provides a basis for determining what the learner knows at a given time. The second testing affords a basis for measuring his progress. The difference between the scores

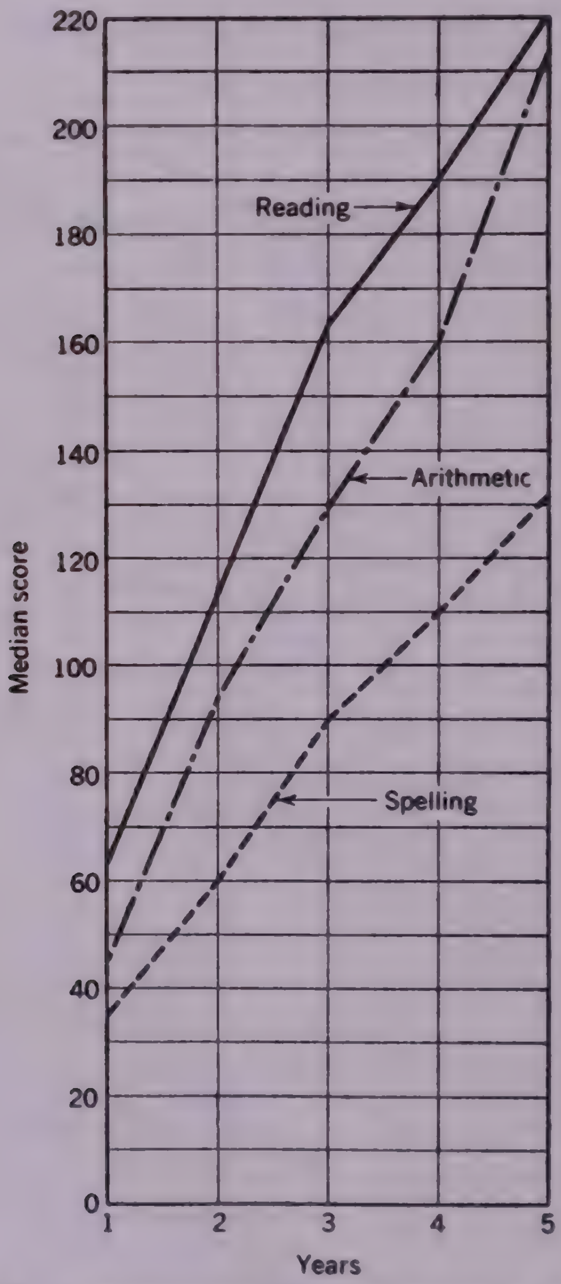

Fig. 15-2. Improvement in three school subjects over a period of five years (Hildreth). From S. L. Pressey, Psychology and the New Education *(New York: Harper and Brothers, 1933).*

upon the first and second testing constitutes the gain (or loss) that has occurred.

The technique may be adapted to the subject matter of an assignment, a unit, or an entire course, the only requirement being that there be a pre-test and an end-test, so that changes in the learner's performance may be measured. Teachers are interested in knowing the present status of achievement, but they are more interested in the change that has occurred during a certain period of time.

Learning in school is a continuous process. It extends through periods of instruction and study followed by testing, after which further instruction and study occur. The results of learning are confirmed in a regular manner by some kind of evaluation, which may be followed by a consideration of difficulties and the elimination of errors.

Nature of gains of learning

Two closely related and interdependent processes make up the gains of learning. Progress depends upon how *acquisition* and *retention* supplement each other. The acquisition process refers to the cumulative effects of instruction when first measured, whereas retention refers to their sustained effects. These two processes are so closely related that, in reality, when we are measuring acquisition we are also measuring retention. Without the ability to retain the effects of previous learning experiences there could be no progress from one practice period to another. It is customary to refer to the mastery of learning material up to the first formal testing as *initial acquisition.* The ability to maintain gains after a definite lapse of time following initial acquisition may be referred to as *retention* proper.

Acquiring and forgetting as instruction continues. To keep acquisition and retention in the foreground during a course of instruction requires systematic planning. This includes consideration of the major elements involved in a learning program: (1) defining the abilities to be developed; (2) selecting and organizing learning materials; (3) selecting activities to be performed by the learner; (4) devising testing situations to measure accomplishment; and (5) plans for giving and using tests. Each of these elements was included in a course of instruction [1] designed for 100 seventh-grade general science pupils.

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[1] A. H. Word and R. A. Davis, "Acquisition and Retention of Factual Information in Seventh-grade General Science During a Semester of Eighteen Weeks,"

Two of the abilities to be developed in this course were ability to *recall information* and the ability to *explain data.* The course was organized into nine units based upon the content of a textbook. The activities of the pupils were limited to reading the assignments in the textbook and becoming ready to take part in class discussion. The tests were designed to measure attainment in the two abilities mentioned above. Pupils were informed they would be given the tests at the end of each two-week period of instruction—at the end of each unit. They were not informed, however, that their retention would be checked at two-week intervals.

At the end of the first two-week period of instruction on Unit I, the two types of test were given to measure the amount of *initial acquisition* that had occurred during this period. At the end of the fourth week (the second two-week period) the pupils were given the two kinds of test on the material of Unit II. They were also given at this time duplicate forms of the tests that had been previously used for the material of Unit I. Consequently, at the time of testing the material of Unit II, the pupils were required to demonstrate their retention of the previous unit. During the remainder of the course the same types of test were given following each unit. The test at each testing period measured initial acquisition of the current unit and retention over the immediately preceding unit.

The progress of these seventh-grade pupils in recalling information is shown graphically in Fig. 15-3, in which average scores of the group are plotted cumulatively. The solid line refers to initial acquisition (scores pupils made on tests of current material at the end of each unit). The broken line shows average scores made on retention tests for each two-week period. This figure shows that while the pupils are mastering the material of Unit II, for example, they are forgetting some of the material of Unit I; while they are mastering Unit VII, they are forgetting part of the material of Unit VI.

By substituting for average scores, the record of an individual pupil in Fig. 15-3 has special meaning. Bill Stewart, for example, would be able to know at any particular stage in this course what his *initial acquisition* and *retention* scores were. He might be told at the end of Unit VII that his initial acquisition score (expressed cumulatively—

Journal of Educational Psychology, XXX (1939), 116-125; A. H. Word and R. A. Davis, "Individual Differences in Measuring Teaching Objectives," *Journal of Experimental Education*, VII (1938), 24-30.

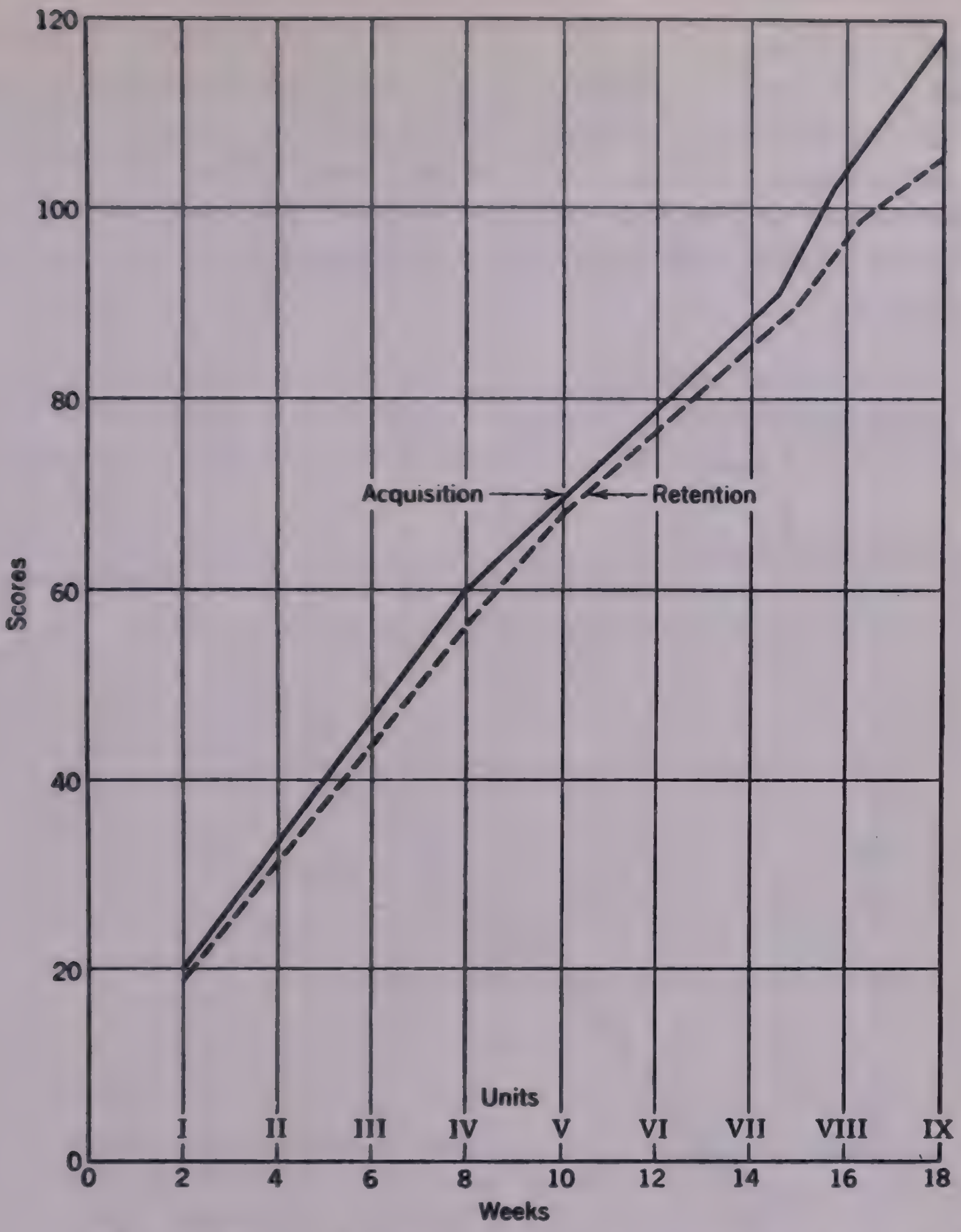

Fig. 15-3. Acquisition and retention scores plotted cumulatively (tests measuring ability to recall facts).

what he knew once up to that time) was 80, and that his retention score (what he knew two weeks after his first test for initial acquisition) was 75. In general his initial acquisition score would be higher than his retention score because some forgetting would be expected.

The results of the test, ability to *explain data,* are shown in Fig. 15-4. The data are presented in the same manner as those in Fig. 15-3. The solid line shows average scores plotted cumulatively for initial acquisition; the broken line, the average scores for retention. It will be noted that the level of retention is almost as high throughout as that of initial acquisition. During the early part of the course the retention scores were even higher than those of initial acquisition. The similarity of the curves of Fig. 15-3 and 15-4 suggests that instruction in the ability to *explain data* may have strengthened ability to *recall information.*

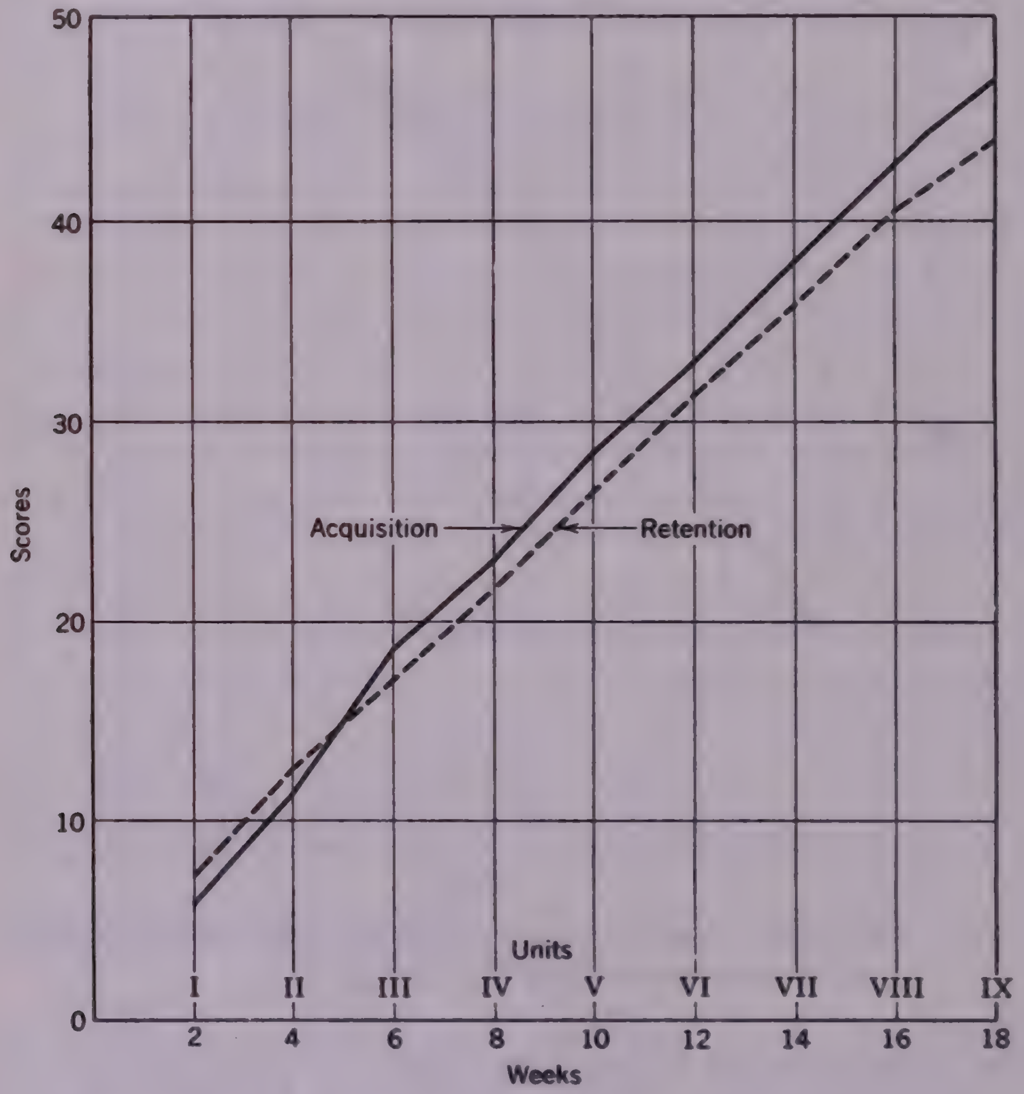

Fig. 15-4. Acquisition and retention scores plotted cumulatively (tests measuring ability to explain scientific data).

The regularity of measuring newly acquired material and retention for two-week intervals doubtless contributed to consistent gains during the course. Since testing itself is an effective means of learning, initial acquisition is strengthened with each successive measurement of retention. Under such conditions retention is relatively high throughout the eighteen-week period.

Acquiring and forgetting after instruction ends. Although functionally similar in every stage of learning, retention that accompanies the acquisition process should be distinguished from that occurring after the instructional period has been completed. We have already dealt with retention as the concomitant of acquisition, pointing out that acquisition involves the combined effects of a certain amount of remembering and forgetting. It is obvious, however, that we cannot leave retention at this point.

In retention studies we are concerned with the same kinds of problem that were involved in acquisition. A principal difference is that a definite period of time has elapsed after the cessation of formal instruction. Two techniques are generally applied in measuring retention in school subjects. One consists of remeasurement of indeterminate gain; the other, remeasurement of determinate gain. The studies of retention in school subjects have either: (1) determined how much was known at the end of a learning period, and how much was known at definite intervals thereafter (retention being measured by objective tests); or (2) measured the gain in a subject or course during the period of instruction (using initial and end tests), and determined how much of the gain was retained after varying periods of time. Of the two procedures, the latter obviously is more accurate. This more refined technique provides for a test at the beginning of a course. The difference between the scores made on the pre-test and the end-test constitutes the gain during a period of instruction. It rules out the knowledge that pupils may possess at the beginning of a learning period.

Study of retention of school subjects in this country appears to have begun in 1906, when W. F. White[2] conducted an experiment on retention of arithmetic during summer vacation, using a group of second- and seventh-grade pupils. Since that time, classroom studies have involved many types of subject matter and have included grades from the first through college. We shall refer briefly to typical studies conducted (1) in the elementary grades; and (2) in the high school and college.

Elementary-school subjects. Almost all of the elementary-school subjects have been investigated at one time or another. Standardized achievement tests are generally used to measure achievement. In a majority of studies the technique of indeterminate gain is employed: an end-test at the end of a grade or course, and a re-test after a lapsed interval of time to measure the amount retained. The greater number of studies have dealt with the summer-vacation period of approximately three-months duration.

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[2] Study reported by M. J. Nelson, Thesis, University of Wisconsin, 1929.

Bruene [3] administered the Stanford Achievement test in May and an equivalent form the following September to children in the fourth, fifth, and sixth grades. Fundamentals of arithmetic showed a loss of .68 of a school year during the three-month summer vacation. Language usage showed a loss of .31; spelling .29; history and literature .26; and arithmetic reasoning .07. Two subjects, reading and nature study, showed a gain of .22.

Studies of arithmetic show reasonably consistent results. Kramer [4] reports a median in arithmetic of 39.7 in June; the median for the same group in September is 37. Garfinkle's [5] study of arithmetic during summer vacation shows a decrease in accuracy and a loss equivalent to almost two years of work for all groups tested. Brooks and Bassett,[6] Bruene,[7] and Kolberg [8] show losses of varying amounts in history during summer vacation. Morrison,[9] on the other hand, shows a gain equivalent to more than one-half school year on items of information, and approximately the same amount on items relating to thinking.

Investigations dealing with retention of elementary-school subjects during summer vacation, when there is no prescribed routine and when review and study are voluntary, show a considerable loss in some subjects and gain in others. The subjects showing the greatest loss are usually those least likely to be practiced during summer vacation. Subjects such as arithmetic fundamentals and spelling, for example, exhibit the greatest loss; arithmetical reasoning and reading, which may be used during vacation, often show appreciable gain. Improvement has been noted also in the case of world history, nature study, and certain aspects of science, probably as a result of incidental learning through media such as motion pictures, radio, television, travel experience, and recreational reading.

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[3] M. D. Sterrett and R. A. Davis, "The Permanence of Learning: A Review of Studies," *Educational Administration and Supervision*, XL, No. 8 (1954), 449-460.

[4] *Ibid.*

[5] *Ibid.*

[6] *Ibid.*

[7] *Ibid.*

[8] *Ibid.*

[9] *Ibid.*

One of the most ambitious programs designed to offset the amount of loss during summer vacation is that sponsored by Cook,[10] who conducted a study over a period of twelve years. The subject of reading was selected for special study. The procedure consisted of three steps: (1) giving standardized tests during May; (2) subjecting pupils to varied kinds of reading experience during summer vacation; and (3) giving duplicate forms of the same tests in September, to measure the changes that had taken place. Children who participated in this program were significantly better than those who did not join. Those who did not participate in one or more reading plans in the program lost on an average .4 of a school year during the summer. On the other hand, only 5 out of approximately 230 children who read at least two books and worked on assigned materials for six or more weeks showed a loss in reading when retested in the fall.

High-school and college subjects. Unlike the data for the elementary grades, which are generally presented as standardized test scores for various subjects, retention studies of high-school and college subjects are often analyzed according to the kinds of ability measured. These abilities frequently include ability to apply principles to new situations and the ability to interpret data as well as ability to recall items of information. The measuring instruments used in many of these studies are locally constructed examinations prepared for the particular purpose. The techniques of both *indeterminate* and *determinate* gains are used. The time intervals vary widely, but many studies make use of the summer-vacation period.

Frutchey,[11] in studying high-school chemistry, used a pre-test in December followed by a post-test in May. One year later a re-test was given to measure the amount retained with respect to application of principles, knowledge of chemical terms, symbols, formulas, valence, and ability to balance chemical equations. The re-test in this study shows that 84 per cent of the initial gain was retained in the area of general information; 92 per cent in application of principles; and 66 per cent in knowledge of chemical terms. Retention computed on the basis of composite scores amounted to 81 per cent of the initial gain.

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[10] R. C. Cook, "A Dozen Summer Programs Designed to Promote Retention in Young Children," *Elementary School Journal*, LII (1951-52), 412-417. See also R. C. Cook, "Vacation Retention of Fundamentals by Primary-grade Pupils," *Elementary School Journal*, XLIII (1943), 214-219.

[11] F. P. Frutchey, "Measuring the Ability to Apply Chemical Principles," *Educational Research Bulletin*, XII (1933), 255-260.

Wert,[12] using college students, measured per cent of loss or gain over a three-year period in relationship to the gain made while taking a course in zoology. For the three-year period there was a gain of 60 per cent in application of principles to new situations. There was also a gain of 20 per cent in a test requiring the ability to interpret new experiments. On the other hand, there was a loss of 50 per cent on tests measuring terminology, function of structures, and main ideas. A loss of 80 per cent was noted in the test requiring the matching of names with structures.

One of the first observations to be made of studies dealing with high-school and college subjects is the rapid forgetting of facts, dates, names, formulas, abstractions, and detailed kinds of information. Figure 15-5 shows typical retention curves for several subjects. In general, these curves indicate that a large amount of subject matter is forgotten within a short time, frequently as much as 50 per cent within a single year. It should be kept in mind, however, that these studies involved use of tests designed to measure the amount of information the learner is able to recall. Of greater significance are results obtained by measuring retention of abilities other than recall of information.

Studies are consistent in showing that abilities of a higher order than memorization and recall are retained over long periods with slight loss. Some of these abilities, as has been indicated, show gain after instruction has ended. Cook[13] has summarized the results of studies that measure such abilities as follows:

> These experiments indicate that learning involving problem-solving relationships and the operation of the higher mental processes are relatively permanent, and that unrelated facts and mere information are relatively temporary. Unless learning involves differentiation and integration of old and new responses into a problem-solving type of mental process or into an organized behavior pattern it has little permanence or value. How was it learned? is the important question.

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[12] J. E. Wert, "Twin Assumptions," *Journal of Higher Education*, VIII (1937), 136-140.

[13] W. W. Cook, "The Functions of Measurement in the Facilitation of Learning," in E. F. Lindquist (ed.), *Educational Measurement* (Washington, D.C.: American Council on Education, 1951), pp. 3-46.

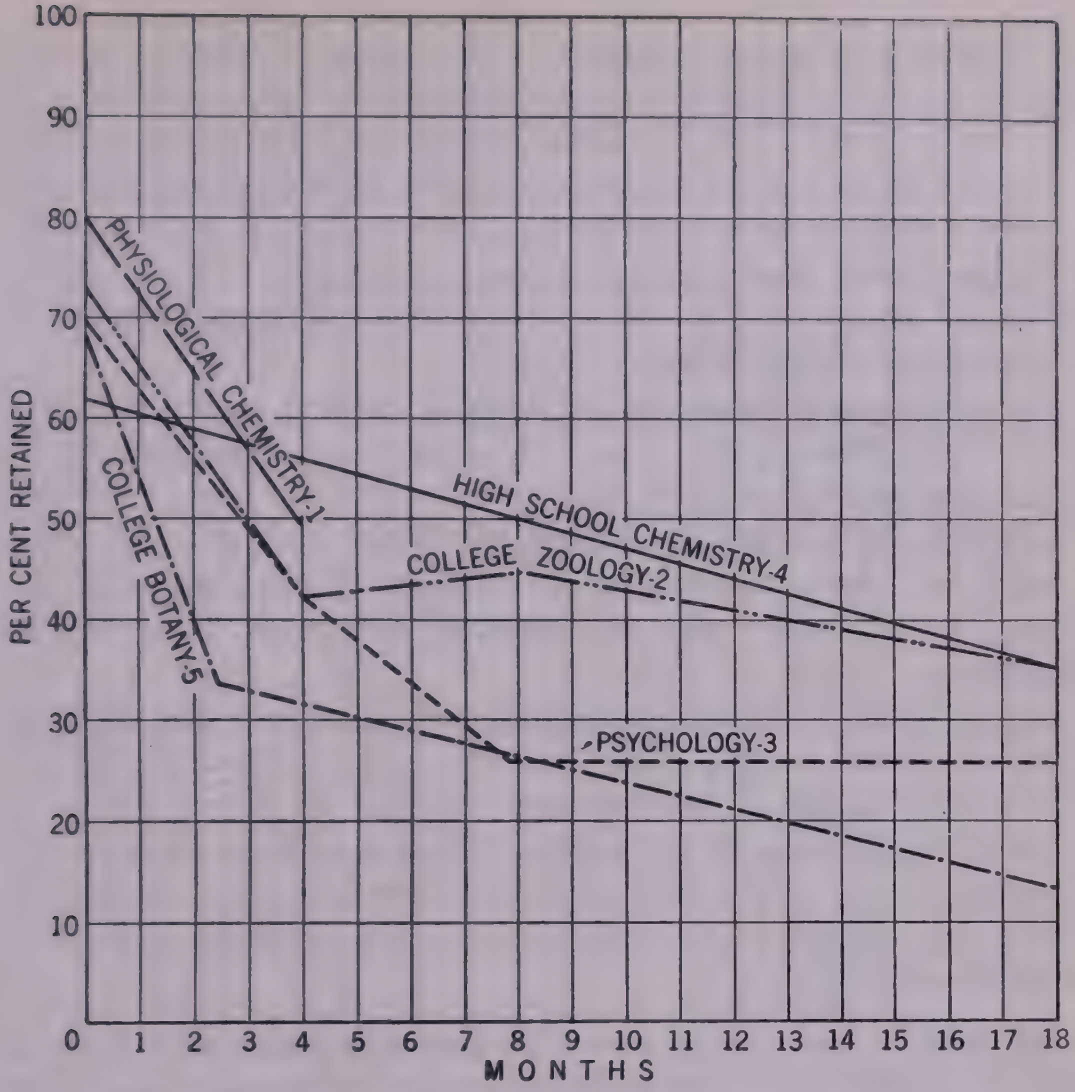

Fig. 15-5. Percentage of subject matter retained at the end of courses as measured by objective tests and at definite intervals after that time. (Curves 1, 2, and 3 after Greene; curve 4 after Powers; curve 5 after Johnson.)

Conditions of learning

Up to this point we have been principally concerned with the processes of acquisition and retention. In the studies reviewed no effort was made to interpret the results in the light of the conditions under which they were obtained. The purpose was to illustrate the processes and to indicate the trend of results.

We now turn to the problem of considering the conditions that affect the learning processes of acquisition and retention. Under certain conditions these processes will be enhanced; under others, inhibited. Interpretation of the results of studies must be made on the basis of the conditions existing at the time. In a similar manner we need to take into account the procedures followed in our teaching if the results are to be appraised. Both research workers and teachers are constantly striving to discover and provide conditions that will be most effective in producing the kind of learning desired.

Providing proper conditions for learning requires careful planning. Much of this planning can be done while preparing a learning program before instruction begins. In a carefully worked out plan, conditions favorable to learning can be built into the instructional program. After this has been done, there is need not only for skillfully putting the program into effect but also for adapting instruction to unforeseen conditions.

Comprehensive treatment of the numerous conditions that affect the learning process would require an entire volume. Our purpose here is to consider a few of the significant ones that are largely within the control and direction of the teacher. These conditions relate to (1) organization and presentation of learning material; (2) learning activities; (3) testing; (4) guidance; and (5) emotional and social climate for learning.

Organization and presentation of learning materials. Ranking high among the requirements for success of a course of instruction is the manner in which materials are organized and the meaningfulness of their presentation.

Organization. Organization implies there has been an effort to prepare learning materials so that the learner is able to perceive relationships between one element and another in a learning situation. It also suggests that, while the learner advances from one unit of material to another, he has opportunity to build a background that will help him in learning additional units. When learning materials are properly organized, there is a continuing relationship evident between the units of work. An organized situation is one that makes sense and gives evidence of some pattern.

Proper organization enables the learner to know where he is going and how to get there from the beginning of a course of instruction to its completion. It encourages the learner to view his materials in prospect and retrospect and gives him a feeling of satisfaction when he has completed his work. It establishes the main direction, with appropriate signposts to guide the learner and teacher. It also provides a basis for review and marks off the periods for testing and evaluation.

Modes of presentation. Organization in itself is ineffective without considering the manner in which materials are presented. The meaning that learning materials have for the learner is dependent in part upon the mode of textual presentation, including the length of sentences, the kinds of words used, and the length of paragraphs. It is also dependent in part upon the use of such materials as graphs, charts, pictures, and audio-visual aids. Because of the extraordinary part played by seeing and hearing in the learning process, the discussion will deal with the effectiveness of audio-visual aids.

The need for varied media of presenting learning materials grows out of the inability of words and abstractions to describe or explain. Everyone admits that, if words are inadequate, the next best procedure would be to have the learner come close at hand with the objects or events to be studied. But since this is generally impossible, the next best means is to bring replica of materials directly to the classroom by audio-visual aids.

The function of such aids is to make an appeal to those senses that can respond adequately. If we wish to present the sound of a bird, the most effective mode of presentation would be the bird itself, engaged in producing the sound. If this is not possible we might use some mechanical device for its reproduction. It is extremely difficult to describe color, smell, physical shape, sound, and motion by means of words. Few persons, for example, can resist the impulse to define a spiral by making motions with their hands. One can recognize the sound of a coyote upon hearing it, and identify certain wild flowers by sight. These evidences of knowledge are nonverbal and suggest that seeing and hearing had more to do with initial impressions than the printed page.

We no longer need to depend upon opinion regarding the effectiveness of varied kinds of presentation. Research in psychology and education is replete with findings dealing with one or another aspect of these different modes. The purpose of some investigations has been to compare the effectiveness of audio-visual aids with conventional methods. In others, the purpose has been to compare one aid with another. In still others, the effectiveness of the slide and silent motion picture has been considered when they are accompanied by the instructor's comments. Effort has also been made to determine the value of the sound motion picture when supplemented before and after presentation by discussion.

Some investigations show that the silent film, with the teacher's commentary, is more effective than either the sound or silent version of the same film. Goodman[14] compared four aids: the *sound* motion film, the *silent* motion film, the sound film strip, and the silent film strip. The silent motion film proved superior to the other three; the two film strips were next and about equal in value. The sound film was the least effective.

In Craig's[15] experiment, first-year students in a modern secondary school were shown *silent* and *sound* copies of the same film. The effectiveness of the two kinds of film was measured by tests given immediately after presentation and four weeks later. On the test that measured *initial acquisition*, the differences in favor of the silent presentation with teacher's commentary were marked and statistically significant. On tests of *retention* (four weeks later), similar differences were noted, the differences being in favor of the silent form of presentation. Craig believes the teacher will obtain better results when he uses the silent version of a sound film and supplies his own commentary. In this way he can adapt the film to his purpose, and can alter the commentary as the occasion requires.

The net effect of research on audio-visual aids is that the difference between the effectiveness of one mode of presentation and another is relatively small. There would appear to be a close relationship between the effectiveness of one sense and another. For best results, use of several modes would be preferable to one.

Charts, diagrams, and tabulations in various forms make facts stand out strikingly. Film strips and slides are advantageous in arresting and freezing motion, permitting the learner to concentrate on the specific items. They afford a convenient means of exhibiting charts, maps, pictures, or enlarged cross sections of material. Much of the teacher's own material can be easily converted to slide form.

Considerable progress is being made in capitalizing on the possibilities of the sound motion picture. Many of these newer films are especially valuable for showing steps of a process, of portraying various aspects of life, or the scenery of distant places. Motion pictures are singularly appropriate for depicting movement. Movies in color make a complete lifelike presentation in many situations, such as a study of animal and plant life.

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[14] D. J. Goodman, "Comparative Effectiveness of Pictorial Teaching Aids," *Journal of Experimental Education*, XII (1943), 20-25.

[15] G. Q. Craig, "A Comparison Between Sound and Silent Films in Teaching," *British Journal of Educational Psychology*, XXVI (1956), 202-206.

Learning activities. Two important facts are so obvious that they may be easily overlooked. It is the learner who learns: learning requires active interest and concentrated effort of the learner. Learning is a result of what the learner does with his learning material and what the material does to him. The teacher often believes that, if the student listens to explanations given in class, learning has taken place. He may be surprised, however, to find what he thought had been taught well is not reflected in his tests and examinations. Unless the learner actively responds to a task, little learning results.

The importance of the learner's activities is demonstrated in Seagoe's[16] review of investigations. The individual who attempts to recall while studying, learns better than when he reads and rereads his material. His efficiency is superior when he takes a test over a piece of material immediately following its study. In science courses the learner who participates in laboratory experiments does better than when his activity is limited to the lecture-demonstration kind of presentation. The lecture-demonstration is generally superior to lecture-discussion in high schools and colleges. Discussion is superior to the lecture in college classes. The lecture is generally superior to reading independently. Note-taking aids learning because the learner does something with his material at the time that he hears it. If he organizes and edits his notes, he gains more than when simply recording the main points. He learns best when he is most actively identified with a learning situation.

Activities and abilities. The problem of directing the learner's activities must be coordinated with the kind of abilities that we wish to develop. First, we make a decision regarding the kind of abilities that are appropriate for cultivation. Second, we select the activities believed to contribute to development of these abilities. It will be helpful to outline a number of conditions governing the regulation of activities.

1. The learner must have opportunity to practice the abilities selected. If we desire to cultivate, in social science, the ability to comprehend information, there must be ample opportunity to read, discuss,

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[16] M. V. Seagoe, *A Teacher's Guide to the Learning Process* (Dubuque, Iowa: William C. Brown Co., 1956).

and interpret materials. If one of the abilities is to interpret graphic and tabular data in the social sciences, the learner must have practice in intepretation of such data. If an ability in science is the application of principles, there must be opportunity for identifying and applying principles to new situations. This does not mean that we can be sure the individual's learning is restricted to the abilities suggested by the teacher. It does suggest, however, that we take the most direct route to the cultivation of the abilities selected. We direct practice upon the function to be improved.

2. The activities selected should be within the capability of the learner. This requirement is so obvious that its discussion hardly seems necessary. Experience shows, however, that it is an important problem in teaching. Can the learner perform the activities selected? Are they within his grasp? What activities might be engaged in at the beginning of a course? What activities might serve to develop preparatory skills for different kinds of activity later? These questions relate to the problem of readiness for learning, on which there is abundant research. On a more immediate basis it is our job to discover whether our students are capable of profiting by the kind of activities we select for them. Much of the information needed can be obtained before a course begins by evaluating the kind of learners expected. But even more important information may be collected during the first few class meetings, when we begin to know individuals.

3. Several kinds of activity may contribute to the development of a single outcome.[17] The problem of directing learning would be easy if our job were limited to selecting the task, identifying the response, and directing practice. The learning process is not that simple, however. For example, the learner may be expected in a given case to develop the ability to solve problems in social science. Obviously, if this ability is to be developed, the learner should have specific practice in solving social science problems. Several activities, however, contribute to the development of his ability. While the learner is acquiring information in social science he may be thinking about the methods others have used to solve such problems. He may also form generalizations from his reading of facts that would assist him in reaching solutions. Almost any activity such as visiting juvenile court rooms, observing city playgrounds, or simply reading current events would contribute to his ability to solve problems in this field.

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[17] R. Tyler, *Basic Principles of Curriculum and Instruction* (Chicago: University of Chicago Press, 1950).

4. A single activity may contribute to the development of several outcomes. The learner who is studying an assignment in social science to acquire information is, at the same time, developing ability to solve problems involved in his reading. He may also be learning to interpret data and to form generalizations. While reading for information he will likely change his attitudes toward certain social issues and discover interests he will later pursue. His specific task may be to become able, as a result of his reading, to recall assimilated information. But in reality, his study results in the development of several abilities or outcomes.

The fact that several kinds of activity contribute to a single kind of ability makes it possible to capitalize on the learner's efforts in attaining a certain outcome. The fact that a single kind of activity contributes to several outcomes holds promise for reaching many goals.

Activities and measured outcomes. Cook [18] has conducted a series of experiments in introductory sociology for the purpose of measuring outcomes in relation to different kinds of activity. He was particularly interested in measuring the influence of different activities upon the outcomes of *factual knowledge, attitudes,* and *critical thinking.* In one experiment, he employed the technique of "matched groups," the only variable being differences in the method of teaching. One group was taught principally by the lecture method, labeled the academic-learning procedure. In the other situation, classes were organized into small groups, each group being concerned with a problem chosen by its members. For these students there were few lectures, but many field trips. Certain specialists were also invited to share their ideas in group discussions. The instructor assisted in directing "study-group activities," giving help when needed.

Here we have two contrasting situations. In one, predigested materials are laid out and their mastery is required. In the other, the learner is encouraged to discover his own solutions with as little direction as possible.

The results definitely favor the group working under the flexible-work plan. The two groups showed the same average gain of 22.5 points on recall of information. The gain of the group following the flexible plan was 14.8 points on *attitudes*, which was approximately twice that of the academic-learning group. On the test of *critical thinking* the gain for the *flexible* group was 12.1 as compared with 3.5 for the *academic* group. Cook concludes:

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[18] L. A. Cook and Cook, E. F., *A Sociological Approach to Education* (New York: McGraw-Hill Book Co., Inc, 1950); L. A. Cook and R. C. Koeninger, "Measuring Learning Outcomes in Introductory Sociology Courses," *Journal of Educational Sociology,* XIII (1939), 208-225.

> Study after study casts serious doubt on the effectiveness of academic teaching in human relations areas. Students do learn, but what they learn, how much and how permanent, in comparison with group procedures and perceptual learning is not encouraging. The lecture-textbook system is best in imparting information, although retention of facts beyond immediate recall is low. The forgetting is high, for one tends to remember the learnings that are repeatedly used. . . .
>
> Academic learning is probably weak in influencing attitudes and weakest of all in inducing behavioral changes, a point of critical importance in any sort of life-centered school. Ideas do not get translated into values and values into habitual ways of acting. While it is never easy to do, for it depends in part on circumstances beyond a teacher's control, the need to work for this objective is an educator's greatest responsibility.

Some teachers stress one or two kinds of activity, whereas others emphasize several. Many regard reading, listening to explanations, and discussions of primary importance. Still others emphasize projects and problems where information is collected and evaluated. Some teachers require few activities but give tests frequently; others sponsor many activities but give tests infrequently.

Several different kinds of activity are needed to ensure learning and to recognize individual differences. Tyler[19] states that the experiments in teaching zoology show that some students learn *principles* through certain types of laboratory exercise, others through demonstration and problems, and still others through other kinds of experience. No one type of activity appears to be equally effective with all students. Loomer[20] reached a similar conclusion on the basis of a study of the effects of three types of learning activity in art. He concludes:

> Various attempts must be made to adjust the learning experiences to the way individual students learn . . . . some learn best through lecture and demonstration . . . where the emphasis is on verbal learning; others . . . learn best in a laboratory situation where the actual manipulation allows more motor coordination in the learning process.

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[19] R. Tyler, "Prevailing Misconceptions," *Journal of Higher Education* (June, 1933), 288.

[20] I. C. Loomer, "A Study of Certain Effects of Three Types of Learning Experience in Art as Revealed in the Drawings by the Participants," *Journal of Experimental Education*, XXII (1953), 65-102.

Testing. Three overlapping but fairly distinct functions of testing are recognized: (a) the directive function, (b) the selective function, and (c) the motivating function.[21]

The directive function. Testing, more than any other element in an instructional program, directs the learning process. The teacher may state that certain abilities are to be developed and suggest the activities to be used; but it is the kind of tests given that influences the learner most. Where testing programs are sponsored by school systems, testing also influences what teachers stress in subjects and their methods of teaching.

The type of test the learner expects to take influences his method of study. He will use certain methods when anticipating an essay examination and other methods when expecting objective tests. When the student expects an essay examination, he tends to search for relationships and to organize his materials into large divisions or units. He also devotes considerable time to recalling information. The student spends more time in preparing for an essay examination than for the objective type.

Methods of studying also vary with different types of objective examinations. The recall technique requires the learner to supply answers to questions; the recognition requires him to identify answers listed. Knowing that the recall technique will be used, the learner studies his material in detail, making note of such factual data as names, dates, locations, and the results of specific studies. On the other hand, when expecting to be measured by the recognition technique, he is likely to concentrate on principles and points of view. He seems to operate on the belief that if he understands the general theme or point of view he will be able to select from the answers provided. The methods used by the student in preparing for the recognition type of item prepare him for that type mainly; the methods used in preparing for the recall type prepare him for more than recognition.

As a result of different methods of study in anticipation of the two measuring techniques, thoroughness and accuracy of information are affected at the time of measuring initial acquisition. The recall technique makes more rigorous demands upon the learner's accuracy. He also fares better on tests of retention that may be given later.

The selective function. Tests define accomplishment, and enable the learner to determine the rightness or wrongness of his responses. Experimental evidence indicates that the more direct and immediate the knowledge of results, the better. Commenting on the importance of immediate knowledge of results in training programs, Wolfle says:[22]

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[21] W. W. Cook, *op. cit.*

> Giving the men in training an *immediate* knowledge of their results was one of the most useful contributions that psychology made to military training. Instances occurred where men presumably trying to learn a complex weapon never knew what they did well or poorly. In some cases the men got worse rather than better.

If the learner is right we should let him know; if he is wrong we should tell him wherein he is wrong. In some situations the learner profits most when he is given opportunity to analyze and correct his own errors.

An experiment by Meddleton[23] is an excellent example of an effort to relate testing to the learner's activity. He measured the effect of specific practice upon acquisition and retention of the four fundamental arithmetical processes. Each child in the experimental groups had *daily practice*, using specially prepared sheets of number combinations. Tests for measuring progress were given at approximately three-month intervals: December, 1952, March, 1953, June, 1953, and July, 1953.

The plan of specific practice with the use of systematically compiled work sheets resulted in marked improvement. The superior gains of the experimental over the control groups were maintained after the vacation period. Meddleton interprets his results as follows:

> Whether the children were conscious of it or not, it would appear that the practice material in the basic number combinations has been both diagnostic and remedial. Each child had the opportunity to notice his own errors. Any regular occurrence of a mistake throughout the class could have been observed by the teacher, and led to further consolidatory exercises. Besides this each child was afforded the chance, after corrections, of remedying his own particular number weakness. Repetition of the number combinations at a later date provides a ready estimate of the value of any remedial measures.

The motivating function. Tests also stimulate increased effort. In the high schools many teachers believe tests constitute the principal means of stimulating learning. In the colleges and universities the student's interest in testing is heightened because of the importance attached to a few crucial examinations. The sporadic last-minute efforts of college students toward the end of a quarter or semester attest to the motivating effect of examinations.

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[22] D. Wolfle, "Military Training and the Useful Parts of Learning Theory," *Journal of Consulting Psychology*, X (1946).

[23] I. G. Meddleton, "An Experimental Investigation into the Systematic Teaching of Number Combinations in Arithmetic," *British Journal of Educational Psychology*, XXVI (1956), 117-127.

If tests stimulate the learner to increased activity, it would seem that for best results they should be given frequently. Fitch[24] conducted an experiment involving two classes in government at Purdue University. The group used as control consisted of 97 students who took only the monthly quizzes, whereas the *experimental* group consisted of 198 students who took the weekly quizzes in addition to the regular monthly ones. The study was designed to determine the effect on achievement (a) when short quizzes were given in one group over the weekly assignment, and (b) when voluntary discussion groups were provided for both classes. To stimulate learning, discussion groups were arranged so that the students interested in improvement could voluntarily receive additional help.

The group that had frequent quizzes in government consistently made higher scores than the group having only monthly quizzes. Part of this superiority is accounted for by voluntary attendance at discussion groups. The evidence suggests that the frequent quizzing motivated students to attend discussion groups regularly. Frequent testing appeared to motivate students to read more extensively from supplementary sources and to extend their preparation beyond routine requirements.

Some studies show that where tests are given frequently lower ability groups in particular are benefited. They seem to need the extra stimulus of frequent testing and the knowledge of progress revealed. Higher ability groups need less stimulation to learn and are more capable of analyzing their progress.

The motivating effect of testing depends in part upon the learner's possibility of success. For one who is incapable of improving his status, testing may have a negative effect; for one who is capable of doing well, a positive effect. It also depends in part upon the standard the learner sets for himself, whether he aspires to high, average, or passing accomplishment.

Guidance. All of the conditions considered up to this point have dealt with the larger problem of guidance, whether we were dealing with the organization of material, the activities of the learner, or the management of tests. We now consider the problem of when to help the learner and when to encourage him to work independently. Guidance is primarily a process of limiting trial-and-error activities by preventing errors and focusing attention upon those activities that assure success. Guidance may either prevent or correct errors, depending upon the time of its administration.

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[24] M. Fitch, A. J. Drucker, and J. A. Norton, "Frequent Testing as a Motivating Factor in Large Lecture Classes," *Journal of Educational Psychology*, XLII (1951), 1-20.

The effect of guidance on learning is well established by experimental investigations. Davies [25] measured the effectiveness of guidance in learning a motor skill. The guidance group was taught by a standard technique of shooting the bow and arrow. The other group practiced with no guidance other than minimum instruction in the handling of equipment. The results of the experiment are summarized in Fig. 15-6, which shows average percentage scores for the two archery groups.

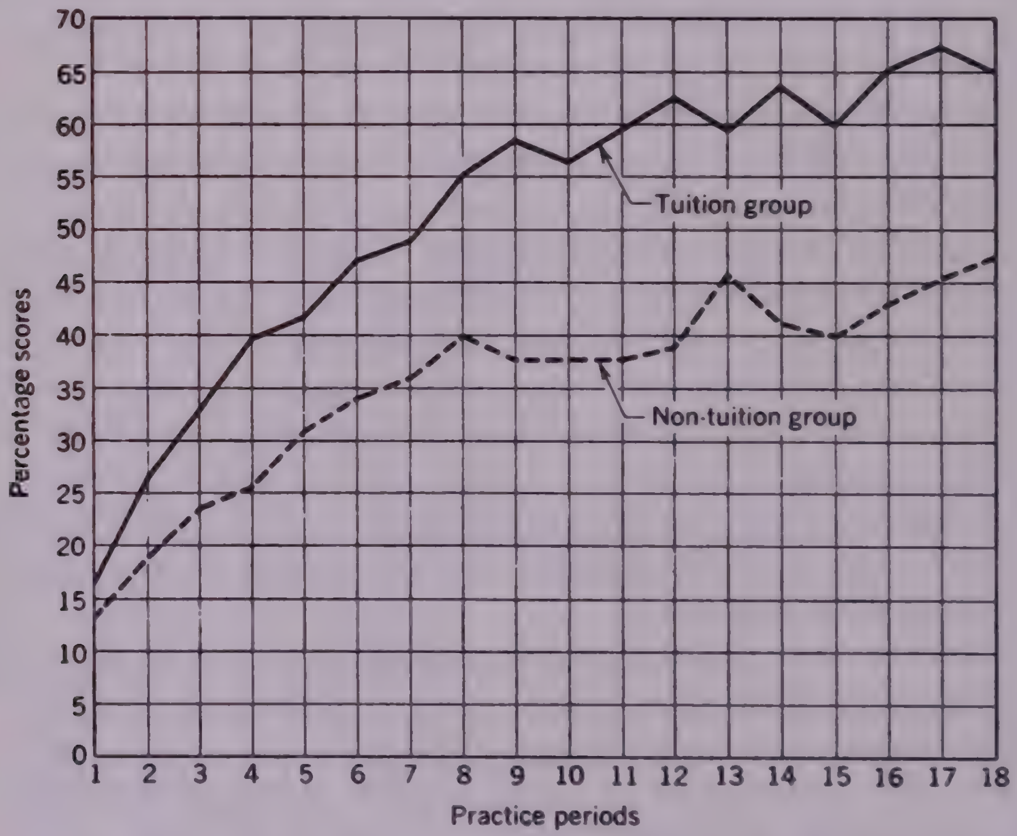

Fig. 15-6. Daily average percentage scores for the two archery groups. (See footnote 25.)

In commenting on the striking results of this experiment, Davies points out that the teacher can assist the learner in three significant ways: (1) He can prevent many errors that characterize the performance of the learner during the early stages of developing a skill. (2) He can direct attention to errors the learner ordinarily does not detect. (3) He can set a good example by demonstration.

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[25] D. R. Davies, "The Effect of Tuition upon the Process of Learning a Complex Motor Skill," *Journal of Educational Psychology*, XXXVI (1945), 352-365.

Guidance may be introduced at any one of a number of stages during learning. It may be given before the learner has made any attempt to learn, or at any point after he has made several unguided ones. Although the time and place for guidance will vary with the kind of task and the particular needs of the individual, it is most effective during the initial stages of learning. If guidance is given during the initial stages, the errors committed are prevented from becoming habitual. If the learner makes errors and is conscious of their occurrence, they are not likely to be detrimental.

There is also the problem of the amount of guidance. Torrance[26] believes that excessive guidance causes resistance to learning. He states:

> It is not the role of the teacher to force people to learn against their wills. Nor is it his task to trick them into learning. In fact . . . he is only deluding himself if he thinks he can. The victim of such trickery has ways of dropping material. . . . The function of the teacher would seem to be to help each student discover and use means of satisfying his needs. . . . Much failure in school is actually the result of active resistance to over-direction and domination.

Excessive guidance defeats its purpose; there is a point in every learning situation where the efficiency of guidance rapidly diminishes. It is usually desirable to withhold all but the most necessary initial guidance until the learner has had opportunity to survey his task. When it is clear that the learner understands the essential features of his task, guidance should be withdrawn. Between the extreme of giving too much guidance and too little, there is an optimum amount. If the learner is given excessive help, initiative is thwarted; if he is given too little, interest is lost and confidence weakened. One purpose of all guidance is to encourage initiative.

Emotional and social climate for learning. Recognition of emotional and social needs of children grows out of our belief that the school should make a contribution to the total well-being of the learner. In a more specific sense, it grows out of the effect that emotional and social behavior has upon achievement.

Relationship to achievement. For evidence relating to the effect of emotional and social behavior upon achievement, we shall draw upon two groups of research data: (1) readers versus nonreaders; and (2) retarded versus accelerated pupils.

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[26] P. Torrance, "The Phenomenon of Resistance in Learning," *Journal of Abnormal and Social Psychology*, XLV (1950), 592-597.

1. Readers versus nonreaders. Studies conducted in reading clinics[27] reveal that a high percentage of seriously retarded readers exhibit emotional problems. Two types of nonreaders presenting contrasting patterns have been identified by clinicians as the *aggressive* and the *submissive.* The aggressive are quarrelsome, defiant to authority, jealous of their brothers and sisters, hyperactive, and uncooperative in school. Two-thirds of these children are ill-tempered, spoiled, stubborn, and demanding; 50 per cent have had fears for which their aggressive behavior is probably compensatory; more than half have no friends. Those classified as *aggressive* are bullies or gang leaders. The submissive nonreaders resemble the aggressive "nonreaders" in their jealousy of brothers and sisters. They do not attempt, however, any of the antisocial acts that are performed by aggressive children. They are quiet, docile, immature, and helpless; many are fearful, anxious, and overdependent upon adults.

The family histories of these "nonreading" aggressive children reveal an attitude of open and undisguised parental rejection. This rejection is shown by frequent corporal punishment and preference for the child's brothers and sisters. In contrast, the parental pattern of the submissive "nonreaders" is predominantly overprotective and restrictive. Often this symptomatic overprotection may be a subtle and disguised form of rejection. The parents may be compensating for feelings of guilt caused by their own previous feelings of rejection. Three-fourths of these "nonreaders" show clear evidence of parental rejection or overprotection.

Children having reading disabilities often suffer from severe emotional insecurity and anxiety. The worried, anxious child who is learning to read will have difficulty noticing the fine distinctions between such forms as "b" and "d," and "was" and "saw." He may be wondering whether his mother really loves him, whether she will be there when he arrives home, and whether the children in school will laugh at him when he makes a mistake. No other inadequacy in the learner creates so great a sense of frustration and failure as a reading difficulty. In many difficult situations, an individual may be able to rationalize his deficiency in terms of the unimportance of the problem or in terms of some unavoidable cause to indicate that he is not at fault. It is more difficult to rationalize a reading disability, because every aspect of an academic career is affected by it.

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[27] See The Staff of the Reading Clinics of the University of Chicago, *Clinical Studies in Reading, I* (Chicago: University of Chicago Press, 1949), No. 68.

2. Retarded versus accelerated pupils. Studies indicate that accelerated children excel in interest in school work, effective effort, and possession of desirable traits to a greater extent than retarded children. Investigations of the relationship between nervous-emotional stability and achievement in elementary-school pupils show that the stable group surpasses the unstable group in grade placement. Pupils conspicuously nervous and emotional tend to be retarded in mental and educational age.

Sandlin[28] studied social and emotional adjustment of regularly promoted and nonpromoted pupils. He found children who made slow progress did not receive social approval or acceptance from their younger regularly-promoted classmates, especially in the upper elementary grades. They also exhibited feelings of discouragement and failure, antisocial behavior, and dislike for school activities. They were subject to reproach and criticisms from teachers and parents and ridicule from their younger classmates.

3. Increasing learning through understanding behavior. Ojemann and Wilkinson[29] were interested in discovering the effect of the teacher's understanding of pupil behavior upon academic achievement. Two groups of pupils were equated on a number of factors, such as chronological age, intelligence quotient, scholastic record, attitudes, and general adjustment. In the experimental group all possible data were brought together, and the investigator analyzed each pupil's case. As a result of this analysis, he made suggestions for understanding and interpreting each pupil's behavior for the teacher. No such provisions were made for the control group.

As a result of this procedure, significant differences were found in grade point-averages in favor of the experimental group. There were also significant differences with respect to two other aspects of improvement: Attitudes of the pupils toward the school improved and there was a decline in personality conflicts. The changed attitude of the teachers was even more significant than the quantitative data of the experiment, as illustrated by typical comments of teachers as follows:

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[28] A. A. Sandlin, *Social and Emotional Adjustments of Regularly Promoted and Non-promoted Pupils* (New York: Bureau of Publications, Teachers College, Columbia University, 1944).

[29] R. H. Ojemann and F. R. Wilkinson, "The Effect on Pupil Growth of an Increase in Teacher's Understanding of Pupil Behavior," *Journal of Experimental Education,* VIII (1939), 143-147.

> After discovering it was shyness and nervousness rather than sulkiness which prevented L. C. from reciting I made a special effort to see what could be done to help him overcome the difficulty. I seated him so he could be centrally located, praised him at every reasonable opportunity, encouraged him not to do things alone but in company with his classmates, as asking him along with others to pass papers and occasionally to read aloud.

Relationships between pupils and teachers. The extent to which a pupil works in harmony with classroom purposes may hinge upon the attitude the teacher creates in him. It is axiomatic that pupils make better responses for a teacher whom they like than for one whom they dislike. Every word and act of the teacher affects each pupil, often in different ways, creating feelings that include the negative ones of antagonism and unhappiness.

Likewise, the teacher is affected by the words and acts of pupils. Certain groups stimulate good teaching more than others. It is no less true of teachers than of pupils that attitudes generated by the classroom setting influence the quality of work accomplished as well as the quality of teaching. The classroom group constitutes a unique situation, representing not only the influence of two levels of maturity, one upon the other, but the impressions that each person creates. Each individual brings with him a pattern of emotional and social behavior. Each pattern has been formed from experiences outside the school as well as those within the school.

1. What pupils like in teachers.[30] Teachers well-liked by pupils in the intermediate grades are characterized as being: nice, kind, fair, friendly, understanding, willing to help, able to explain clearly. Traits that especially seem to characterize the teacher liked least are: scolds pupils a lot, usually cross, often bossy, difficult to approach with problems, often becomes angry with pupils, and does not see things as children do.

The teacher most liked by junior-high-school pupils is described as kind, friendly, cheerful, with a sense of humor. He is always helpful when assistance is needed and provides opportunities for pupils to help with various tasks. He understands children and their problems, recognizes all children as individuals, is modest and neat in dress, has a clear pleasant voice; doesn't nag, ridicule, or speak sarcastically; doesn't threaten or punish so severely that pupils fear him; is not bossy or domineering; does not arbitrarily impose his will upon his pupils; and finally, allows freedom in the classroom while maintaining respect from all.

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[30] P. A. Witty, "Evaluation of Studies of the Characteristics of the Effective Teacher," in *Improving Educational Research* (Official Report of the American Educational Research Association, 1948), 198-204.

High-school pupils regard the following traits in a "good" teacher as most important: knowledge of subject matter, clearness of explanation, fairness. They regard of less importance such traits as humor, good temper, social ability, and neatness.

Opinions of pupils at these educational levels indicate the importance of desirable relationships between pupils and teachers in the learning situation. The learner appreciates a school that provides security, shared experiences, recognition of individual success, and opportunities for personal and social adjustment. Witty concludes that children respect teachers who have the following characteristics: (1) the inclination and ability to understand children, (2) the desire to obtain instructional materials from diversified sources to satisfy the varied levels of interest and attainment, and to use different approaches to ensure successful learning for each individual; and (3) the inclination to record and appraise growth so as to encourage the learner to make steady progress.

Symond's[31] study of the characteristics of the effective teacher, as based on pupil opinion, shows that superior teachers liked children; inferior teachers disliked them. The teachers having a superior rating were personally secure and self-assured; inferior teachers were personally insecure and had feelings of inferiority. Superior teachers were well integrated and possessed desirable personality traits; inferior teachers tended to be personally disorganized.

2. Democratic versus autocratic methods. As has already been indicated, pupils prefer democratic to either laissez-faire or autocratic methods. Adolescents especially resent being treated as less mature than adults. They welcome opportunities to express themselves freely in a group in which they feel secure, and appreciate definite and meaningful assignments, not dictatorial ones. They are most resentful of being given assignments as punishment. To them, the lecture method is suggestive of teacher domination; hence, the lecture is the least liked teaching method. Pupils prefer the discussion method or a combination of discussion and informal lectures.

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[31] P. M. Symonds, "Characteristics of the Effective Teacher Based on Pupil Evaluations," *Journal of Experimental Education*, XXIII (1954-55), 289-310.

Lewin, Lippitt,[32] and others have conducted studies in which comparisons are made of autocratic and democratic methods of leadership. Their results show that students are more tense when led by autocratic methods. There is also more dominating and bullying behavior among the students who are led by such procedures. Students being led by democratic methods tend to show increased cooperation toward a common goal. After having become accustomed to democratic methods of leadership, they are eager to share with each other their materials and results.

Several investiagtors have attempted to apply in teaching some of the techniques and ideas associated with nondirective counseling. This method minimizes the memorization of information and tends to assist the student in learning more about how to think and less about what to think. The instructor withholds evaluation; he provides an atmosphere of free discussion. In using this technique he is particularly interested in the psychological implications of the students' behavior.

Schwebel and Asch[33] note a tendency for well-adjusted students to approve nondirective teaching and for the poorly adjusted to prefer *directive* teaching. More outside reading was done by those who approve nondirective teaching techniques. The students working under conditions of nondirective techniques tended to place more emphasis upon gains in self-confidence and deeper insight into their own motivation, and had a more tolerant acceptance of others. They also showed more initiative in their work, and a greater tendency to make decisions and to accept the consequences of their actions.

Summary

Learning always involves some change in the learner's behavior. This change may be expressed by intellectual efficiency or skill in motor performance. It may also be manifested by the less tangible kinds of responses such as appreciations, attitudes, or interests. Two techniques are used in measuring gain in school situations. One of these measures *indeterminate* gain, the other *determinate* gain.

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[32] K. Lewin, R. Lippitt, and R. K. White, "Patterns of Aggressive Behavior in Experimentally Created Social Climates," *Journal of Social Psychology*, X (1939), 271-299.

[33] M. Schwebel and J. M. Asch, "Research Possibilities in Non-directive Teaching," *Journal of Educational Psychology*, XXXIX (1948), 359-369. See also M. J. Asch, "Non-directive Teaching in Psychology, An Experimental Study," *Psychological Monographs*, XLV (1951).

The learning process includes both acquisition and retention. Without retention of the effects of previous training, no progress could be made during successive periods of practice. Acquisition refers to the cumulative effects of training, whereas retention refers to its sustained effects. Efficiency of learning, therefore, depends not only upon how much is acquired, but also upon how much is retained of what is acquired. Some differentiation, however, should be made between retention while instruction is in progress and retention after instruction has ended.

Forgetting tends to increase rapidly with the passage of time in the case of the ability to recall detailed types of information. On the other hand, higher abilities, such as the ability to apply principles to new situations and to interpret data, are retained over long periods with slight loss.

A principal purpose in all learning situations is to provide conditions that will enhance the learning process. The conditions largely within the control and direction of the teacher include: (1) the organization and presentation of learning materials; (2) learning activities; (3) testing; (4) guidance; and (5) the emotional and social climate for learning.

An organized learning situation is one that makes sense and gives evidence of some pattern. A fairly close relationship exists between the effectiveness of one mode of presentation and another. For best results several modes of presentation are preferable to one. The individual learns best when he is actively identified with learning materials. Several kinds of activity are needed to recognize individual differences and to ensure thorough learning. Three functions of tests are recognized: (1) the directive function; (2) the selective function; and (3) the motivating function. Guidance may either prevent or correct errors depending upon the time of its administration. Recognition of emotional and social behavior grows out of the concern of the school for the total well-being of the learner.

QUESTIONS AND EXERCISES

for discussion and study

1 How is learning usually defined? How does the educator's concept of learning influence the instructional and administrative activities of the school?

2 How is learning studied in the school? What aspects of learning are generally involved in learning experiments?

3 How do you account for the fact that true-false and multiple-choice examinations are frequently used to measure the results of learning in informal testing situations? What kinds of mental process are required in these types of examination?

4 Select a subject you are taking and analyze your own methods of studying it. What methods tend to "pay off" best at examination time?

5 Give evidence from your own experience to show that acquisition and retention operate simultaneously. What significance does this fact have for teaching?

6 How may teaching be ordered so that acquisition is at a maximum and forgetting at a minimum?

7 How do you explain the fact that retention studies have tended to stress recall of detailed information?

8 How do you account for the fact that higher abilities, such as the ability to apply principles and to interpret experiments, are retained over long periods with slight loss (or even gain), whereas ability to recall specific items of information is quickly forgotten even though instruction may have stressed such recall? What implications do such findings have for teaching?

9 In the elementary school, activities generally serve the same purpose as tests. In the secondary school and college, however, tests afford the principal means of appraising students. Is there anything wrong with these practices?

10 The exercise you are now doing is one way of learning the materials of this chapter. List three other ways that might be used effectively.

11 What evidence is there for the belief that the best assurance for successful performance on a comprehensive examination at the end of a course is consistent study from day to day and week to week?

12 When, if ever, is "cramming" justified as a study practice?

13 On the basis of your experience and study of the materials of this chapter, prepare a paper of approximately six pages outlining the *conditions* that you regard as *most effective* in facilitating the learning process. In preparing this report, try to recall and evaluate your own experiences in high school and college.

14 Outline a systematic program for teaching some school subject.

15 Compare the emotional influence of different kinds of teacher—dictatorial, sentimental, indifferent, and intellectually zealous—upon yourself or upon pupils you have known.

16 Outline various disciplinary problems you have observed in school and analyze them as symptoms of (a) chronic emotional distress, (b) conflict with inflexibility of the school program, (c) developmental difficulty, or (d) lack of intellectual stimulation, particularly at the upper levels of mental ability.

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CHAPTER 16

Motivation in school learning

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THERE IS VERY LITTLE SCHOOL LEARNING without mental activity on the part of the learner. The most effective learning takes place when there is a maximum of mental activity. Maximum mental activity is best attained through strong motivation.

Motivation is the superhighway to learning.[1]

The major problem of the curriculum-maker and the classroom teacher is in knowing and applying the science and art of motivation. How do children learn "in doing what comes naturally"? Can such situations be artfully created? If so, how? What is the best technique for utilizing this knowledge in motivating school learning?

In our present state of knowledge, there is no sure method or procedure to guarantee the desired results in so many easy lessons.

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[1] Cf. "The organism must be motivated to learn" (McConnell); "Learning will proceed best if motivated" (Anderson); "Motivation is an essential condition of learning" (Melton); "The problem of motivation is central both to educational psychology and to the classroom procedure" (Harris); "The problem of motivation lies at the very heart of a sound educational program in a free society.... Motivation is indispensable to learning. It represents the antecedent, dynamic background for both original behavior and its modifications" (Gates); "Motivation is the central factor in the efficient management of the process of learning. Some type of motivation must be present in all learning" (Kelly); "All motives are learned" (McClelland); "Motivation is the basic problem of psychology in education" (Bernard).

However, much data are now available in the literature of motivation and learning that can be of great help in producing more effective teaching.

It is our task to present the best obtainable information based on known facts, experimental and clinical studies, observation, and the experience of successful classroom teachers as concisely as possible within the confines of a single chapter.[2]

A few preliminary considerations

The child is a dynamic, living, growing, developing, maturing personality. Human beings share with all living things the universal, generalized, undifferentiated, more-or-less vague, urge to live. The infant unconsciously and automatically seeks those activities that aid in survival. Gradually this vague urge to survive takes on many manifestations according to the peculiar culture of his group, in short, from his total environment. The teacher is not directly concerned with the hereditary factors in the child. By the time the child starts school he has already a well-developed personality. Many of his attitudes have become more or less stable. Whatever may be said in defense of John Locke's *tabula rasa* theory will certainly not apply to the kindergarten child, for he is already a dynamic, growing, developing, maturing personality.

Nevertheless, as part of the total environment, the teacher has the privilege and responsibility of not only utilizing the native needs and wants in motivating school learning, but also of helping to direct, and, to some extent, shape these dynamic needs and wants according to the ideals of a democratic society. The task of the teacher is doubly important and rewarding.

The child is a total personality. Another factor to be constantly kept in mind is that the child is a total personality; an "integrated organized whole." It is the individual, the self, the totality, that has to be satisfied in the fulfillment of any need and want. This makes possible the acceptance of substitutes (in most cases) and presents the teacher with a multiple-choice situation. When we speak of individual parts such as needs, desires, wishes, likes and dislikes, and so on, it is for the sake of convenience. The totality is too complicated to take hold of in a single grasp. It should not be assumed, however, that these units have any entity or any validity apart from the total organism.

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[2] Due credit will be given to authors for direct quotations and other reference to their contributions. Lack of space precludes a detailed description of the experimental data. For the convenience of those who wish to pursue the subject further, a selected list of references is given at the end of the chapter. Attention is also called to the references in the footnotes. Many of these references contain recent detailed, descriptive, firsthand experimental data.

Unconscious and semiconscious needs and wants. The individual is also motivated by unconscious and semiconscious needs and wants. Fortunately, many of these can be redirected by proper motivation in formal education. We shall concern ourselves with these as well as the conscious in presenting the practical suggestions for effective motivation of school learning.

Practical suggestions

Any successful school program will have to take into account the dynamic nature of the child, his past experience, his total environment plus individual differences, and the manifold needs and wants as they manifest themselves.

The following practical suggestions are presented as tools for the classroom teacher. Care should be exercised to keep them from turning into weapons. "Brain washing," in one form or another, may be used by unscrupulous parties to influence people. Manipulating people, individually and collectively, is becoming a science. Some of the new social scientists talk of the "depth approach" and call themselves motivation analysts, motivation researchers, social engineers, and so forth. The cold war and all propaganda, including the big business of advertising,[3]

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[3] Could it be that sincere, patriotic educators and devoted scientists and investigators are unwittingly playing into the hands of those who would use their findings for selfish and nefarious purposes? This could happen even in the classroom. For a well-documented, factual discussion of the modern technique used in advertising, see V. Packard, *The Hidden Persuaders* (New York: David McKay Company, Inc., 1957). A more favorable account of motivation in depth is presented by J. G. Frederick, *Introduction to the New Science and Art of Motivation Research* (New York: Business Bourse, Publishers, 1957). He defines motivational research as "...an attempt to dredge up out of the more or less hidden depths of human nature and human personality if possible some good practical hints as to how to sell people a particular item of goods readily and agreeably." See also L. O. Brown, "What Motivational Research Is and How It Works: Its Advantages and Shortcomings,". *Advertising Age*, XXVI (1955), 65-69.

The science and art of motivation have come a long way in the last three decades. In addition to the experimental studies by psychologists and educators and the discoveries by the motivation researchers in depth, is the newest approach in the form of "subliminal projection," designated by some as a "frightening development." James W. Vicary, head of the firm called The Subliminal Projection utilize the art of motivation. The technique of manipulating people is a two-edged sword in and out of the classroom.

Maturation. It is useless to attempt motivation in school learning if the assignment is too difficult or the goals too remote for the child's readiness or his maturation.[4] Maturation and motivation must be synchronized. Formal learning can take place only if the learner is physically, mentally, emotionally, and culturally mature enough to understand and carry out the assignment. For example, very young children are influenced more readily by immediate satisfactions, follow the more primitive needs and wants, and are not too strongly motivated by outside incentives. They also have a relatively short attention span.

The connection between motivation and maturation has received a great deal of experimental and clinical study in recent years with remarkable success.[5] Further studies will determine more accurately the degree of maturation required for the learning of specific subjects and also reveal whether retardation or precociousness is due to heredity or environmental factors. Individual differences, however, will always present a problem to the classroom teacher. Children are at present classified in the schools largely according to their chronological age. Although chronological age does set a sort of pattern for maturity, it does not eliminate the problems of individual differences and variations in the development of different phases of maturity in the same child.

Bringing assignment within child's experience. Experience is not only the best teacher: it is the only teacher. There can be no learning

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Company with headquarters in New York, is the inventor. A message is flashed on a television or movie screen for one three-thousandths of a second. Although this is too fast to see or to register consciously, the subconscious takes it in and acts upon the suggestion. A check on results shows that sales, imposed by this means, were increased from eighteen to fifty-eight per cent.

[4] Maturation, as such, is treated fully elsewhere in this text. See Index.

[5] "Research in child development is providing working generalizations for the classroom teacher. Children differ in their rate of growth.... Growth is an individual matter and must be appraised from the point of view of the nature of the individual. There can be no common expectancy for achievement when it is conditioned by sex differences, the total maturity of the child, and the family from which he comes.... Children as they present themselves in schools have more things in common when viewed broadly than when single attributes are studies in detail. Similarities as well as differences deserve attention in classroom." Quoted from W. C. Olson and B. O. Hughes in A. P. Coladarci (ed.), *Educational Psychology* (New York: The Dryden Press, 1955), pp. 80-81. See also C. Bühler, "Maturation and Motivation," *Personality*, I (1951), 184-211; R. Metroux, "Implicit and Explicit values in Education and Teaching as Related to Growth and Development," *Merill-Palmer Quarterly*, II (1955), 27-34; E. Stellar, "The Physiology of Motivation," *Psychological Review*, LXI (1954), 5-22.

apart from experience and every experience can be an education. We speak of a self-educated man as though there were some other kind of education. Broadly speaking, all education is self-education. Formal education by the schools merely seeks to improve the quality of the education by improving the quality of experience, for the quality of learning is determined by the quality of experience on the part of the learner.

Learning is also conditioned by past experience.[6] We interpret new experience in the light of the old. Identical environmental circumstances mean different things to different people and are variously interpreted. Their reactions also differ widely. Eyewitnesses at the scene of a crime or accident will give widely different interpretations of what actually transpired. If all witnesses give identical accounts, they are suspected of collusion and their testimony discounted. Learning based on past experience and tied in with the "total pattern" is more effective in comprehension and speed of learning.[7] It is better integrated and longer retained because it is better organized. It is more functional and therefore meets the objective of all school learning in producing approved conduct through the various satisfactorily desirable experiences of the learner.

Respect for personality of the child, appealing to ego-maximization. Ridicule and sarcasm are far from the best means of motivating school learning. Children, as well as adults, have their pride and self-respect. Any attempt to embarrass or humiliate a child, especially in the presence of his classmates, is likely to end in one of two undesirable results—withdrawal or pugnacity. Shame and embarrassment are not healthy emotions. They tend to disorganize the personality of the child. They produce uncertainty, hesitation, frustration, loss of confidence and self-respect. Sometimes they force a child to complete withdrawal from school activities and set up a mental attitude against all learning. In extreme cases, the child refuses to cooperate at all. He will not answer any questions, nor talk or utter a single word in school. In most cases the opposite takes place. The child becomes pugnacious and aggressive, with a hostile attitude toward the school and toward society. He is then ripe for delinquency. It is his way (mostly unconscious) of getting back at his tormentors, be they teachers or parents or authority in general.

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[6] "... a person is always the product of the sum of his impressions and it is absolutely impossible for him to cut out a period, or segment, as it were, of his life and go ahead. There is no break in the continuity of the psychic life." A. A. Brill, *Basic Principles of Psychoanalysis* (New York: Doubleday & Company, Inc., 1949), p. 60. See also J. A. Blake, "Comprehension Versus Motivation in Child Behavior," *Understanding the Child*, XXIV (1955), 77-79; A. Mujib, "Motivation and Learning," *Indian Journal of Psychology*, XXIX (1954), 115-123.

[7] Cf. J. W. Atkinson, "The Achievement Motive and Recall of Interrupted and Completed Tasks," *Journal of Experimental Psychology*, XLVI (1953), 381-390.

Disregard for the personal integrity of the child is unwise,[8] because it threatens just about all of his basic needs and wants—self-respect, freedom from fear and the feeling of failure and guilt, the need for love and affection, for security, for achievement and success, and most important of all, the need of belonging and being accepted. A feeling of frustration is the worst psychological atmosphere for motivating school learning.[9]

On the other hand, an appeal to ego-maximization has exactly the opposite effect. We may set it down as a basic principle in motivation that we like those people, objects, and situations that make us feel important. Conversely, we dislike those people, objects, situations that make us feel inferior. Accordingly, we prefer to play those games in which we excel; to associate with people who listen when we talk and who respect our opinions. We diligently avoid situations that are likely to prove embarrassing and which place us in an inferior position. This is why we resent personal questions and being the butt of a joke. Practical jokers who delight in playing pranks on other people rarely can take a joke at their own expense. The teacher can accomplish a great deal more in motivating school learning by appealing to ego-maximization than by shaming, ridiculing, and belittling the would-be learner.[10]

Securing attention, creating interest and enthusiasm. The inattentative child is preoccupied and does not hear what is said. He might as well be absent. Securing attention is, therefore, the primary prerequisite for motivating school learning.

It is well to remember that the attention span is very short, especially in young children. The only thing that will bridge the gap is interest and enthusiasm. Interest may exist to some extent on the part of the pupil; more likely it needs to be artfully created by the teacher.

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[8] See P. M. Symonds, "What Education has to Learn from Psychology," *Teachers College Record* (Columbia University, New York), LVI (1955), 277-285; M. Sherif, *The Psychology of Ego-Involvement* (New York: John Wiley & Sons, Inc., 1947).

[9] Cf. K. Wiles and M. Beauchamp, "How Can a School Provide a Good Emotional Climate?" *National Education Association Journal*, XL (1951), 462-463.

[10] This topic is treated later on from another angle under praise and reproof.

Capitalizing on natural interests and cultivating new ones is the mark of a good educational program. "Intrinsic interest must be achieved."[11] Interest is created by the acquisition of new skills, by encouragement, and above all, by satisfying experience. The wise teacher will take advantage of the slightest show of interest. The best time to explain a subject is when it is presented to an inquiring mind—when the child asks questions. This is the true pedagogical moment; it is better than the "logical" moment according to the lesson plan.

The teacher's own interest and enthusiasm are contagious and will go a long way toward inspiring and maintaining interest on the part of the pupil. As the child grows and develops, he acquires and displays new interests commensurate with his level of maturation. These may be used as points of departure in the development of new interests in an ever-expanding process.[12] The process may be accelerated by offering multiple-choice situations and numerous incentives suitable to the child's abilities and comprehension.

Significance of attitude in motivation.[13] Closely related to attention and interest is attitude. Attitude is one's set to react in a given way in a particular situation. It is relatively permanent and wider in scope than interest. Attitude limits and channels motives. In its broader aspects, it is almost synonymous with motive. It is a habitual response to identical or near-identical total situations. A person's perspective—his interpretation of units and segments of experience as well as totalities and general outlook on life—is gravely affected by his interests and attitudes. Attitude is not only a readiness for new experiences: it also creates the contours of the new experience and sets boundaries.

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[11] H. G. Wheat, *Foundations of School Learning* (New York: Alfred A. Knopf, Inc., 1955), p. 51: L. Postman, "Perception, Motivation and Behavior," *Journal of Personality*, XXII (1953), 17-31.

[12] J. Pikunas, *Fundamentals of Child Psychology* (Milwaukee: Bruce Publishing Company, 1957), p. 22. "Spontaneous use of unfolding abilities. . . . The establishment of new patterns in any aspect of life absorbs the child for a long while. This urge to practice unfolding abilities and skills is based upon the principles of intrinsic motivation. . . . Curiosity for new experiences, exploration, experimentation and knowledge increase steadily and underlie the child's self-expression. Abilities are to a certain degree irrepressible."

[13] "Attitudes toward alternative acts determine the direction that action will take; and information about the conditions of attitude change will be highly relevant to the problem of controlling motivation": summary by L. M. Soloman of H. Peak. "Attitude and Motivation," *Nebraska Symposium on Motivation*, Sect. 30: 483 (1955), 149-189. See also I. E. Bender, "The Development of a Scale for Attitudinal Motivation," *Journal of Abnormal and Social Psychology*, XLVIII (1953). 486-494: A. R. Mead. "Research About Attitudes," *Journal of Educational Research*, XLVIII (1954), 233-234; I. Sarnoff and D. Katz, "The Motivational Basis of Attitude Change," *Journal of Abnormal and Social Psychology*, XLIX (1954), 115-124; L. W. Doob, "The Behavior of Attitudes," *Psychological Review*, LIV (1947), 135-156; C. I. Howland, "Changes in Attitude Through Communication," *Journal of Educational Research*, XLV (1952), 498.

On the other hand, anticipation often overmobilizes attitude to the extent of "reading" something into the situation, exaggerating and distorting the facts. If you are waiting for someone whom you are expecting shortly, any person appearing on the distant horizon will be mistaken for this person, because anticipation and expectation tend to magnify the slightest points of similarity.

Praise and reproof. Many experimental studies have been conducted to determine the relative merits of praise and reproof in motivating school learning. [14] According to Schmidt,[15] there is no unequivocal evidence one way or the other. Results prove that both are useful in moderation and may have a bad effect if carried too far or used indiscriminately. "Praise for success and reproof for failure are more effective than indiscriminate praise and reproof." [16] Apparently the personality of the child is a determining factor. Some take to both praise and reproof; others respond best to one or the other. The football coach of a certain college discovered that one of his star linesmen would sulk under reproof and refuse to cooperate, but that praise would build him up to top efficiency.

Other determining factors are age, sex, peculiar circumstances, and most significantly, *how* the praise and reproof are administered.

Most people accept the opinions of others as to their abilities and disabilities. The tendency is to live up to the standards set for them. Witness the boy in school who said, "I could do better if I were not so lazy." How did he get to think of himself as lazy if he had not been designated so by others? Similarly, the so-called "bad boy" is dubbed such in one class and his reputation precedes him in the next. A clever salesman assumes the sale is made and talks as though he believes the prospect to be well-to-do and has good taste. The customer is more likely to meet the expectations of the salesman rather than admit he cannot afford the purchase. The sociologists refer to this as the "mirrored self." Society is the mirror that reflects our social status, traits of character, and personality. Reputation is important not only as a gauge of what others think of us, but also as a determiner of our own opinion of ourselves.

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[14] "The analysis of the data collected indicates that: (1) When introverts and extroverts are grouped together, praise and blame are equally effective in motivating the work achievement of fifth-grade pupils. Either praise or blame is more effective in increasing the work output of fifth-grade pupils than no external incentives; (2) If repeated often enough, praise increases the work output of introverts until it is significantly higher than that of introverts who are blamed or extroverts who are praised; (3) If repeated often enough, blame increases the work output of extroverts until it is significantly higher than that of extroverts who are praised or introverts who are blamed.... Praise or blame should not be judged on an either-or basis, but should be used to fit the case." Coladarci, *op. cit.*, p. 431.

[15] "The Effect of Praise and Blame as Incentives to Learning," *Psychological Monographs,* XXIII, No. 240 (1941).

[16] Wheat, *op. cit.*, p. 319.

Rewards and punishments. Rewards and punishments are in the same category as praise and reproof, if we consider praise as one form of reward and reproof as one form of punishment. Much that was presented above will apply here also, except that rewards and punishments cover a wider area. Praise and reproof would constitute one form of reward and punishment.

The objective in both reward and punishment is identical—to affect future conduct favorably. They differ as to methodology. Reward seeks to influence conduct favorably by associating a pleasant feeling with the desired act; punishment seeks to deter or prevent an undesirable act by associating unpleasant feeling with it. If it were not for the anticipated deterrent effect of punishment and the hope of changing motivation, it would have no reason for existing, except as an instrument of revenge and sadism. It would be sheer cruelty. The question is: Just how successful is punishment in school learning and how does it compare in effectiveness with reward as an incentive? [17]

Advantages and disadvantages of rewards versus punishments. In terms of motivating learning, the advantages of rewards over punishments are: (1) they create pleasurable associations that are strong inducements to repeat the desired act; (2) they have the advantage of being ideo-motive through the force of suggestion; (3) being pleasant, nerate interest and enthusiasm; and (4) they appeal to ego- nd develop high morale.

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(4) in most instances only a few children may hope to win, those least needing motivation.

Punishments also have some advantages as well as some disadvantages. The advantages may be listed as: (1) they often act as a deterrent; (2) they serve as a form of discipline; and (3) they are especially useful if (a) they appear as natural consequences of the undesirable act, (b) are used in combination with reward, and (c) if the child can be made to realize that it is the undesirable act and not himself that is being punished.

Some of the disadvantages of punishments in motivating learning are: (1) they are based on fear, not a healthy emotion; (2) they lose effectiveness if the child is no longer afraid or is willing to take the consequences; (3) they are likely to reinforce the undesirable conduct by overemphasis; (4) they create unpleasant feelings that are negative and associated with failure; (5) the results are not always permanent; (6) they may engender ill-will toward teacher and society; and (7) there is no reliable measure of severity in punishments. Punishments that are considered severe by one pupil may be laughed off by another, and deliberately provoked for the compensation of being in the spotlight by still another.

Success versus failure. Success furnishes its own drive. Like happiness, success is often an end in itself. Many an enterprise is undertaken for the sheer satisfaction of succeeding in that enterprise. Success is, therefore, a type of reward, whereas failure is considered a type of punishment. The success-failure motive runs all through life and is constantly operative in everything we do. It is the chief determiner of morale. Every effort in adjusting to new situations is conditioned by trial and error, or trial and success.

Learning takes place in both instances. We learn by our failures as well as by our successes. We tend to repeat successful attempts. In school learning, both success and failure can be useful within limitations. Failure may be a spur to success. No one wants an easy victory. Every novice hopes to best the champion. On the other hand, if failure is too severe or too often repeated, it is discouraging. It reduces aspiration and learning. As the mercury in the thermometer fluctuates with temperature, so the level of aspiration varies with success and failure as determined in the mind of the learner. What actually happens to us is not nearly so important as what we do about it. "Understood failure challenges effort. Understood success stimulates further effort. . . . From what the pupil knows and understands comes the motive for further learning."[18] Success and failure should be so balanced that the child does not lose his perspective. In the classroom the teacher can manipulate the situation so that every child will get a taste of success to temper the ill effects of failure. Failure may be considered temporary, with success as the ultimate goal.

Children can be taught to take success and failure in stride through classroom situations as well as on the athletic field. There is also the possibility of setting goals and aspirations out of reach as well as out of grasp. If one's aspirations are out of all proportion to his abilities, he may become discouraged, embittered, demoralized.

Positive versus negative. Most investigators favor reward motivation over punishment, because it is positive, whereas punishment is negative. Experimental studies show that learning with positive guidance is superior to negative guidance. The positive is more definitely associated with success; the negative is associated with failure. The positive is more predictable. It sets up a pattern and tends toward habit-formation. The nervous system is so constituted that once a stimulus is received, its force is on-going, even after the original incentive is dropped.

Similarly, an idea tends to work out in action unless it is hindered by another idea or by a physical barrier. The negative approach of telling children what not to do is unfortunate, because it suggests, emphasizes, and keeps "warm" at the focus of consciousness, the undesirable act. The idea takes the form of compulsion and the act becomes inevitable. One reason why New Year resolutions are so easily broken is that they are usually negative—something the person is not going to do in breaking a habit. But stressing the negative serves only to keep the idea so strongly in mind that it gets done despite "will-power."

Another unfortunate feature of the negative approach is that it emphasizes the error and tends to "stamp" it in. In teaching spelling, it is better that the misspelled words not be shown to the pupil. The tendency is to repeat the mistake.

Clear assignments and definite goals. In line with what was said about positive versus negative is the desirability of making assignments and objectives clear and concise. Seeing the goal more clearly is an aid to organization, resulting in better perception of relationships, clearer insight, and superior meaningfulness. Clinical and experimental studies definitely show the effectiveness of clear goals and knowledge of results.[19] Knowing how one is progressing could be an incentive in both success and failure if success is not too easy and failure not overwhelming; otherwise it might have the opposite effect. Athletic coaches usually have a marked advantage in that the pupils possess a clearer insight and understanding of the goals and objectives.

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[18] Wheat, *op. cit.* See also E. L. Lowell, "The Effect of Need for Achievement on Learning and Speed of Performance," *Journal of Psychology*, XXXIII (1952), 31-40; J. W. Taylor, "An Experimental Study of Repression with Special References to Success-failure and Completion-incompletion," *Journal of Clinical Psychology*, IX (1953), 352-355; E. Douvan, "Social Status and Success Striving," *Journal of Abnormal Psychology*, LII (1956), 219-223; E. G. French, "Some Characteristics of Achievement Motivation," *Journal of Experimental Psychology*, L (1955), 232-236.

Self-motivation. Knowledge of results, high aspiration, and clear goals are the best preparation and incentive to self-motivation, especially if the pupil is directed and encouraged to set his own goals and seek intrinsic incentives and superior remote goals. There is no better means of developing character and ideal citizenship in a free society.

The teacher can do much by defining and redefining goals and helping the pupils to do this for themselves by presenting the possible choices and letting them choose. Experienced social workers do not tell people what to do. They help the individual to view his problem objectively and in true perspective. They suggest possible alternatives. The final solution is left to the individual.

The will-to-learn. Self-motivation implies a will-to-learn.[20] A prerequisite to all effective learning is a desire on the part of the learner for knowledge or understanding or for skill. In fact, the speed and efficiency in learning is in direct ratio to the aspiration or will to learn, except perhaps when the urge is intense enough to cause an emotional disturbance and thus interfere with learning. An analogous situation occurs when a person "loses his temper" and renders himself less efficient in a task requiring skill.

In summary of suggestions based on experimental studies on methods of improving the will to learn, Book and Norvell offer the following:

> (1) Demonstrate to the learner by figures and facts that desire for improvement is a condition of advancement; (2) Make the learner feel that it is worth while to exert an effort, and that if he does, he

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[19] See H. C. Birch, "The Relation of Previous Experience to Insightful Problem Solving," *Journal of Comparative Psychology*, XXXIX (1945), 15-22; M. L. Fitch, *et al.*, "Frequent Testing as a Motivating Factor in Large Classes," *Journal of Educational Psychology*, XLII (1951), 1-20.

[20] See L. D. Cohen, "Levels of Aspiration Behavior and Feelings of Adequacy and Self-acceptance," *Journal of Abnormal and Social Psychology*, XLIX (1954), 84-86; J. P. Seward, "How Are Motives Learned?" *Psychological Review*, LX (1953), 99-110.

> will be rewarded by success; (3) Have a reliable method of measuring progress; (4) Keep the learner succeeding so that he may be assured that he has not yet reached the limit of performance; and (5) Show that others have improved and developed beyond the learner, or when needed, that others have failed for a time.[21]

Unconscious needs and wants made conscious. One significant means of strengthening the will-to-learn and improving aspiration is to help the pupil make his unconscious and semiconscious needs and wants conscious. According to Brill, many of our actions are guided by our unconscious.[22] An appeal to emotion is often more effective than an appeal to reason.

Moreover, the unconscious is a truer index of the real innermost wishes and desires, and it never lies. One need not be a psychoanalyst nor concur fully with their theories and practices to take advantage of the many valuable findings by Freud and his followers. Helping the pupil to clarify his unfelt goals and objectives, as well as his pressing immediate needs and wants, gives him a better insight into the reasons for learning. It will also serve to accomplish another major goal of school learning, namely, self-appraisal.

Self-appraisal. Under- or overevaluation of self can be tragic. Many people live mediocre lives because they do not know "their own strength." They have a sense of false modesty concerning their abilities. On the other hand, the person who overrates his capabilities is constantly running into rebuffs and failure for attempting the impossible. Proper appraisal of one's own potentialities is essential to a happy and useful life. It is also central in the learning process.[23]

The school program and the classroom teacher can do much in aiding the pupil to appraise himself and his talents properly. In fact, much of this appraisal is unavoidable in a system of grades, promotions, special rooms, awards of one sort or another, and graduations. The schools and colleges are selective agents for placement bureaus and employment services that rely heavily on the candidates' record in school and the recommendations of their teachers. Our immediate concern is with directing motivation in school learning so as to achieve proper self-appraisal and accelerate learning all along the line. "To the extent that self-evaluation leads to self-knowledge and realistic goal-setting, it can be an important part of the motivational setting of the school."[24]

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[21] Quoted by P. T. Young, *Motivation of Behavior* (New York: John Wiley & Sons, Inc., 1936), pp. 209-210. See also W. F. Book and L. Norvell, "The Will to Learn, An Experimental Study in Incentives," *Pedagogical Seminary*, XXIX (1922) 305-362.

[22] Brill, *op. cit.*, p. 12.

[23] See Cohen, *op. cit.*, p. 84-86.

Means and ends. The so-called average person, as well as the child, is motivated more strongly by immediate needs and wants than by remote ones. The lure of the immediate is greater because it is already on its way to accomplishment. The orientation is favorable. It is like drifting with the tide. In terms of inertia, it represents a body in motion; it needs no initial push or pull. On the contrary, it will take energy to inhibit or divert. With the very young child, one cannot and need not go much beyond the immediate. But as the child matures, he should learn to modify an immediate want for a more remote goal by visualizing the end result more vividly. This will abridge some of the distance and make the remote seem imminent. Some of the enthusiasm and satisfaction of anticipating the distant goal may be borrowed and appropriated to the means motive. The child who is told he must keep his room neat and tidy and stop teasing the cat and little sister if he wants a bike for his next birthday is offered a lesson in self-discipline. Even a very young child can discipline himself by eating meat and potatoes and drinking milk first in order to get later the ice cream and cake for dessert.

Values, ideals, life goals. Choice, as between an immediate and remote goal, or any choice, involves values. Values are meaningless without a hierarchy of values. If everything were of equal value, then nothing would be of value. And a hierarchy of values implies some sort of philosophy of life. Goals ultimately group themselves into value systems. Value systems are synonymous with life goals. They serve as standards, as guiding principles, and place boundaries on behavior. They delineate character and personality.

Ideals, as such, are abstract and cannot motivate anything. It is the personality (the person) that determines behavior. Personality develops in response to basic needs and wants. The process begins very early in life. Personality, in turn, even while in the early formative period, serves to regulate conduct. Motivation of school learning is very much concerned with the development of character and personality both as to method and ultimate result.[25]

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[24] Young, *op. cit.*, p. 65.

[25] See R. E. Bills, "The Effect of Value on Learning," *Journal of Personality*, XXI (1952), 217-222; G. L. Schwilk, "An Experimental Study of the Effectiveness of Direct and Indirect Methods of Character Instruction," *Dissertation Abstract*, XVI (1956), 1845-1846.

To be effective in character-building, ideals need to be personified. It is much easier to be loyal to a person than to an ideal. "Identification" is made more readily to a person than to an ideal. Children are highly imaginative and decidedly imitative. They identify themselves with imaginary and real people whom they admire and envy. They are hero-worshippers. When they are encouraged to imitate worth-while personalities, they unconsciously identify themselves also with the traits of their heroes.

Setting a good example. The teacher is a very important person in the school child's life. He personifies the democratic ideal and serves as a model. This is why the personality of the teacher is just about the most decisive factor in the success or failure of the school program. His influence as a person far exceeds methods and materials in teaching. Some years ago, Hartshorne and May [26] conducted a series of tests for honesty in several types of schools representing diverse ethnic groups and classes of society. They found, among other things, that the personality of the teacher played a decisive role. A certain teacher in one of the schools tested had the highest rating for her classes year after year despite the fact that some of the children coming to her rated lowest the year before coming under her influence.

Group dynamics. The teacher, although very important, is not the only influence in a child's life. His playmates, parents, siblings, relatives, in short, every person with whom he comes into contact influences his behavior directly or indirectly. The relatively new science of group dynamics is shedding a great deal of light on individual behavior in the classroom and in all group contacts.[27]

> Learning in groups seems to be superior to learning in isolation.... Group dynamics are more effective when all members of the group are interested in the problem being studied.... Where there are vast dif-

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[26] H. Hartshorne and M. May, *Studies in Deceit* (New York: The Macmillan Company, 1928).

[27] See E. G. French and I. Chadwick, "Some Characteristics in Affiliation Motivation," *Journal of Abnormal and Social Psychology*, LII (1956), 296-300; I. E. Morrrison and I. F. Perry, "Acceptance of Average Children by Their Classmates," *Elementary School Journal*, LVI (1956), 217-220; A. Zander and A. R. Cohan, "Attributed Social Power and Group Acceptance; A Classroom Experimental Demonstration," *Journal of Abnormal and Social Psychology*, LI (1951), 490-492; W. H. Crockett, "Emergent Leadership in Small Decision-making Groups," *Journal of Abnormal and Social Psychology*, LI (1951), 373-383; A. Mintz, "Non-adaptive Group Behavior," *Journal of Abnormal and Social Psychology*, XLVI (1951), 150-159.

> ferences in motives, group dynamics will be adversely affected. . . . Children are more cooperative, show more initiative, quarrel less, and display less friction and hostility between the members when they work in a group where democratic leadership prevails. . . . Group dynamics offers the best means available for development of social skills essential for democratic living, better social understanding and preparing the individual member of the group for democratic citizenship.[28]

Competition versus cooperation.[29] Experimental studies show that among very young children (infants) the cooperative responses are more noticeable than the competitive responses. True cooperation, however, is a learned reaction and takes time to accomplish.

> Rivalry is an effective incentive to use with children of the elementary school grades, as a means of inducing them to better work in connection with their school studies. The interest which this arouses, the outlet for a natural desire to compete with others of equal ages, and the training which it gives in the building up of a cooperative spirit as opposed to selfish individualism, justifies its use.[30]

Competition and rivalry satisfy basic needs in the individual and the race. We speak of competitive games and often refer to the game of life as such, for, from the cradle to the grave, we are competing for something or other. Competition and rivalry are rooted in the *elan vital*, the evolutionary urge. They constitute the push in the struggle to survive and the desire for supremacy. Competition runs all through life. A man must compete for the means of livelihood, for his social position, for his friends, in fact, for everything that is worth-while. Civilized society has not eliminated rivalry; on the contrary, it has extended the field from the purely physical and biological to the intellectual, social, moral, and spiritual.

Rivalry as a principle of motivation is universally recognized. We make practical use of it in the home, the shop, the school, the playground, the athletic field, and in commerce and industry. It is the greatest urge for increased production and for social control. Our present concern is to determine the role of rivalry and competition in motivating school learning. For information on this point, we rely heavily on experimental studies and statistical research.[31] The object is to utilize the advantages and avoid the pitfalls. The advantages are: (1) it provides zest and meaning to life; (2) it is positive and satisfies a basic urge; (3) it builds up morale and ego-maximization; (4) it stimulates growth, development, and maturation; (5) it could lead to self-improvement, for competition can be against oneself as well as against others. The chief danger is that if competition is too keen, the individual is likely to suffer defeat, humiliation, frustration, and possibly demoralization.

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[28] A. I. Gates, *et. al.*, *Educational Psychology* (3rd ed.; New York: The Macmillan Company, 1948).

[29] See M. Deutsche, "An Experimental Study of the Effect of Cooperation and Competition upon Group Processes," *Human Relations*, II (1949), 199-231; B. M. Phillips, *et al.*, "Effects of Cooperation and Competition on the Cohesiveness of Small Face-to-face Groups," *Journal of Educational Psychology*, XLVII (1956), 65-70.

[30] Young, *op. cit.*, pp. 406-408.

Cooperative rivalry. The paradox of cooperative rivalry may be the answer to raw competition. It is achieved through group competition that contains both elements. Members of a group cooperate with each other while the group competes with other groups. Groups may cooperate with other groups in competition with still other groups, and so on. National groups follow this plan in their alliances. Cooperative and friendly rivalry develop team play, community spirit, self-discipline, high morale. It satisfies the urge to belong, to be accepted. And, most important of all, it encourages participation, so essential in a free society.

Participation through participation.[32] This could serve as a motto for all schools. Participation is both an ideal method of motivating school learning as well as the most desirable objective in all formal and informal education. In a democratic society, it is not only desirable but absolutely essential that every citizen take an active interest in the welfare of the nation by informing himself on important issues and by casting his ballot accordingly, in short, by participating as fully as possible in the life of the community. Participation, then, is the goal of all our striving in education. The best training for participation as a citizen is participation as a pupil and student. Participation as the ideal means and end in education is what is meant by participation through participation. What was said under group dynamics, goal-setting, making methods and materials meaningful to the pupil, and teacher-pupil planning is applicable here.

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[31] Cf. D. Katz, "Group Morale and Individual Motivation," in J. E. Hulett, *et al.*, *Problems in Social Psychology*, pp. 153-157; W. E. Blatz, "Competition," *Bulletin of Child Study* (Toronto), XVII (1955), 1-2.

[32] Cf. E. E. Jennings, "Developing Participation: Some Fundamental Forces," *Personality Journal*, XXXV (1956), 166-170.

Appealing to as many motives as possible and to the total personality.[33] If appealing to a single motive is effective, then appealing to two or more motives is just that much more effective. This is the basic principle of the transfer of learning. It is also significant in the motivation of learning in the first place. "The effectiveness of a given motive in any situation varies directly with the number of cooperating motives or facilitating factors, and inversely with the number of competing motives or inhibiting factors." [34] To make the widest and possibly the strongest appeal, it is useful to capitalize on natural interests, to take into account immediate as well as remote goals, to make the task as meaningful as possible, to arouse interest and curiosity by displaying interest and enthusiasm and by presenting a wide variety of satisfactions and numerous incentives. Much of what was presented above in practical suggestions for effective motivation of school learning is applicable here. A review of these factors is presented in the summary following.

Summary

Using the classroom as an experimental station, the skillful teacher will guide the pupil through new experiences in his drive to adjust and readjust himself to his environment in a democratic society in such a way as to play his best role as a happy and useful citizen. In acquiring such skill, the teacher may profitably explore the practical suggestions presented in the chapter and summarized as follows:

1. Adjust assignments and requirements to the child's abilities, his readiness or near-readiness, to his physical, mental, and social maturation.
2. Bring the assignment within the child's experience and link it up with the present total environment.
3. Respect the personality of the child by appealing to ego-maximization in recognition of the first law of motivation: that life begins and ends with the individual so far as he is personally concerned.
4. Secure attention and create interest and enthusiasm by taking advantage of the "natural" interests of the child and attempt to develop proper attitudes just when the child is ready to be influenced properly.
5. Use praise and reproof judiciously, as prescribed by the experimental findings on the subject.

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[33] Cf. I. E. Farber, "The Role of Motivation in Verbal Learning and Performance," *Psychological Bulletin*, LII (1955), 311-327.

[34] Young, *op. cit.*, p. 25.

6. Apply rewards and punishments within certain limitations and recognize that pleasurable associations are more effective and longer-lasting than unpleasant and painful experiences.

7. Develop good sportsmanship through proper adjustments to success and failure, create opportunities for success in sufficient instances to offset the inevitable failures, and keep them in such balance that the individual will be able to take both success and failure in stride.

8. Emphasize the positive approach, not overlooking the limited usefulness of the negative.

9. Be consistent in recognition of the fact that consistency is far superior to severity and pays large dividends in proper habit-formation and character-building.

10. Make assignments clear and concise so that the pupil will have a readable blueprint of his task.

11. Work out desirable goals and objectives through a democratic approach, enlist cooperation as to method and means, as well as ends and objectives, by defining and redefining methods and goals and offering multiple choices.

12. Attempt to secure self-motivation on the part of the pupil, which is not only proven to be more effective in motivating learning, but which will also go a long way in achieving the ultimate end of all school learning by encouraging the initiative and self-direction so important for a free society.

13. Stimulate and encourage a will-to-learn by developing definite purpose, aspiration, and ambition.

14. Make the pupil's unconscious and semiconscious needs and wants conscious; and more urgently felt.

15. Encourage more accurate self-appraisal.

16. Borrow interest and enthusiasm from the end motive to the means motive, introducing the element of play, which is an end in itself, in contrast with work, which is regarded as a means to an end.

17. Personify ideals to make them more tangible through "identification" and a realistic-idealistic philosophy of life.

18. Set a good example in one's attitude to the pupil and the task at hand, for, in the final analysis, the teacher's personality is the greatest single factor in success or failure of motivating school learning.

19. Take advantage of the recent findings on group dynamics and the urge of rivalry and teamwork.

20. Explore the virtues of cooperation versus competition, having due regard for the experimental studies in the field.

21. Develop the art of cooperative rivalry by participation through participation.

22. Appraise the advantages of drill and the transfer of learning, permitting the pupil to "take" the lesson and integrate it as his own experience rather than having it "poured in."

23. Appeal to the total personality and as many motives as possible.

QUESTIONS AND EXERCISES

for discussion and study

1 Make a list of primary (natural) needs and wants that are more or less universal for human beings. Arrange the list in order of importance to education.

2 Why is the science or theory of motivation relatively simple and the art or practical application most difficult? Explain fully.

3 What is the significance of the statement that we are all alike in kind, but differ only in degree. Enumerate ten ways in which human beings differ in degree. How would you appraise (account for) this difference?

4 What is meant by social pressure? Describe its place in motivating conduct in and out of school situations.

5 What is the possible fate of motives? Why must some motives be realized; others inhibited?

6 Distinguish between primary and secondary motives.

7 Enumerate factors that lead to clearer insight on the part of the pupil and factors that hinder or hold back such insight.

8 Study ten advertisements in a popular magazine and note the nature of the appeals. Which do you consider most effective? Why?

9 Define "motivation in depth." Illustrate its use in advertising.

10 What is "subliminal projection"? Give an example of its effectiveness in motivating sales.

11 Enumerate the merits and demerits of rewards and punishments in motivation of school learning. Which is more effective? Why? What limitations or precautions would you suggest in the use of rewards and punishments in the classroom?

12 How would you distinguish motivated from nonmotivated assignments in school lessons? Which is better? Explain.

13 Discuss the relative advantages and disadvantages of praise and reproof in motivating school learning.

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CHAPTER 17

Transfer and functional learning

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A statement of the problem and its significance for teachers

ALL TEACHERS want their students to be able to use the experiences gained in the classroom in meeting situations in everyday life; in other words, teachers want the learning experiences of their students to function as widely as possible in their everyday learning and living. When a teacher becomes interested in developing more functional learning in his students he must think through the problem of transfer of learning and the part it has played in determining educational thinking and practices.

Every student who reads this chapter, in all probability, has had to take certain courses—say, in mathematics or a foreign language—in either high school or college. The people who established such a practice must have had some reason for thinking that certain courses were sufficiently valuable to be a requirement in the programs of study of all students. The principles that guided the thinking and practice of these earlier educators have been formulated in the Theory of Formal Discipline. This theory has influenced and is perhaps still influencing educational thinking and educational practice more than any other one thing that could be mentioned. Many students have heard some of their high-school or college teachers try to answer questions as to the value of studying the subject that they were teaching. The answer most often given, perhaps, has been that the study of a certain subject sharpens the mind; it improves the memory or the reasoning ability. The writer, a short time ago, heard a university professor say to a large group of university students that mathematics and the languages are the meat and potatoes of the educational diet; other courses of the curriculum would have to be labeled a salad or a dessert; some few courses might have the distinction of becoming a vegetable. One might readily surmise that the above-mentioned teacher taught either mathematics or a language, and he would be right. Such a statement is a clear index of the basis of the educational thinking of this man.

The doctrine of formal discipline has also had marked influence on educational practices in the elementary schools. How have courses in arithmetic become so filled with topics that students rarely meet in their life situations, and with problems that are largely confined between the covers of textbooks? Spelling books have contained ten to fifteen thousand words although students need to know how to spell only three to five thousand. The additional words have never been used by students, but, being hard and difficult, have therefore been included to "discipline the mind." Pupils have been required to learn the name of every cape that projected into every ocean on the globe, not for any useful purpose in life, but to "train the memory."

Teachers and prospective teachers certainly need to have a clear understanding of a theory that has so profoundly affected educational thinking and practice. Shall teachers continue to let the principles embodied in the theory of formal discipline affect their thinking and practices in solving classroom problems? Or shall they abandon this theory, and endeavor to put in its place a sounder and more vital set of principles? It must not be forgotten that every sound practice has back of it sound principles. In dealing with this problem, Mursell says:

> Our attitude toward transfer [of training] determines our attitude towards teaching. If we retain the disciplinary prepossession, instruction ceases to be an art, the whole problem of procedure vanishes, and only drive remains—external drive at that. If we give it up, at once there emerges that great and exacting responsibility to meet which our whole

> vast armament of modern educational techniques has been devised. Hence we are bound to feel that the topic is one of the most immediately practical with which it is possible to deal.[1]

Two terms have been used: *formal discipline* and *transfer of training*. A better understanding of the problem will be obtained if a clear distinction is made between them.

Advocates of the theory of formal discipline have assumed the mind to be made up of *faculties*. Its adherents have often spoken of the faculty of memory, of reasoning, and the like. This theory has further postulated that if the faculty of memory or reasoning is trained by the study of a foreign language or mathematics, so much improvement in remembering or reasoning will result that the student will be better able to remember or reason in every situation where such activities were called for. It has been further assumed that the improvement comes about automatically as the result of studying such a subject, and that the improved faculty, memory or reasoning, functions in a better manner in the newer situations.

Transfer of training is concerned with the question of whether or not the learning of material A—say, mathematics—aids, hinders, or does not affect the subsequent learning of material B—say, physics or chemistry. This theory assumes nothing about faculties of the mind, but is concerned with how the organism meets situations B, C, D, and so forth, after having had an experience in situation A. Educationally, it is concerned with finding out how the organism can benefit to the largest degree from its experience in situation A when it finds itself face to face with situations B, C, D, and so forth.

The teacher who faces this problem from the standpoint of transfer of learning and forgets about formal discipline realizes that the responsibility rests on his shoulders for so teaching his subject that his students learn to transfer their experiences to as many situations as is practical. He realizes that such teaching is the main way to increase the functional learning of his students.

For the teacher who desires to understand this problem thoroughly, it is wise to become acquainted with the historical and scientific attacks on the problem.

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[1] J. L. Mursell, *Psychology of Secondary School Teaching* (New York: W. W. Norton & Company, Inc., 1932), p. 91.

The attempt to solve the problem scientifically

Our educational system in the United States developed from the top down. Harvard College was established as a vocational school to train ministers. A curriculum was set up to meet the assumed needs of the ministers of those days. After a time, students other than those preparing for the ministry were admitted to the college. The curriculum was not changed materially, but the college people justified having other students study the same subjects by citing the disciplinary value of those subjects. Preparatory schools arose to train students to study the established curriculum. When elementary schools were established, they soon came to be thought of as preparing students to study in the secondary schools. Thus, the theory of formal discipline came to be the all-pervasive American educational philosophy.

This doctrine was tacitly assumed to be correct by practically all American school people until about 1890. In this year, William James published his *Principles of Psychology*. In his first volume, he briefly told how he had tested his ability to memorize 158 lines from Victor Hugo's *Satyr*. He then trained his memory by practicing 20 minutes a day for 38 days in learning the first book of Milton's *Paradise Lost*. At the end of this period, he again tested his ability to memorize 158 lines of the *Satyr*. It took more time to memorize the second 158 lines than it did the first![2] James induced four other people to try a similar test of training their memory, and they obtained about the same results as did James. Thus occurred the first significant challenge in American education to the doctrine of formal discipline.[3]

Certainly any intelligent, wide-awake teacher wants to know whether he is justified in believing in formal discipline or transfer of training. Of course, one who accepts formal discipline necessarily assumes that transfer of training takes place, but one who believes in transfer of training need not in any sense assume the existence of formal discipline. Such an important question should not be decided on the basis of opinions of any group, but upon whatever scientific information is available. A summary of what science has to offer toward the solution of this problem will now be presented.

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[2] W. James, *Principles of Psychology* (New York: Henry Holt & Company, Inc., 1890), Vol. I, pp. 666-668.

[3] What James actually pointed out was that although native retentiveness was not improved by practice, memory efficiency might be improved through a mental reorganization or arrangement of experience. While challenging the doctrine of formal discipline, he actually gave support to the efficacy of generalized experience.

The initial scientific attack of James on this problem stirred up a deep and widespread interest among psychologists. Evidence of this interest is found in the some 300 or more studies on the problem that have been published since 1890.

A teacher of Latin might ask how one could scientifically determine whether or not students who study Latin have an improved English vocabulary of Latin derivatives. In order to answer this question, he would have to secure a large group of students who have studied Latin. Another group of students would now have to be obtained comparable in number, intelligence, and educational training to the first group, but without the experience of studying Latin. Next, he would measure the size of the Latin-derivative vocabulary of both groups. If the Latin group showed a significantly larger vocabulary, the teacher would be justified in assuming that Latin had transferred to the English vocabulary. A better way to make such a test is to select two fairly large groups of high-school freshmen who have not studied Latin. Presumably the two groups are equal in educational training. In order to equate the two groups in intelligence, administer a reliable intelligence test. Now measure the size of the English vocabulary of each group, noting particularly the number of words of Latin origin known by each group. The two groups then attend high school for one or two years. Keep the programs of studies of the two groups comparable, except that one group is to study Latin. At the end of one year, and also the end of the second year, measure the size of the vocabulary of both groups, with special attention to the number of Latin derivatives known. If the Latin group possesses a considerably larger Latin-derivative vocabulary, it may be inferred that the study of Latin has aided in the building up of a larger vocabulary. Such a result is called *positive transfer*. If the non-Latin students show a knowledge of a larger number of Latin-derivative words, it may be assumed that the study of Latin has hindered the building up of a Latin-derivative vocabulary. This result is called *negative transfer*. If there is no difference in the size of the Latin-derivative vocabulary of the two groups, it may be said that Latin has had no effect in increasing the size of the vocabulary. In this instance, the teacher may say that there has been an absence of transfer.

Summary of scientific experiments

Many different kinds of materials have been employed in efforts to determine if transfer of training is a demonstrable fact. One or two illustrations of these various types of materials will be presented.

Sensorimotor materials. One experimenter tried to determine whether learning to thread a pathway through a maze with a stylus aided, hindered, or had no effect in learning several other mazes.[4] He also tested the effect of learning the several mazes upon the first maze; that is, he measured the transfer effect of maze A upon mazes B, C, D, E, and F, and also the transfer effect of mazes B, C, D, E, and F upon maze A. Both human and animal subjects were used in this experiment. The results showed that maze A aided in the learning of the other mazes, and the other mazes aided in the mastering of maze A. The degree of positive transfer varied from 19 to 77 per cent. The degree of transfer also varied with the direction of learning; that is, the amount of transfer in going from maze A to the other mazes differed from the amount in going from the other mazes to maze A. A very interesting result was found in testing the effect of maze A upon maze F. Each maze had four sections. Maze F was highly similar to maze A, but section 3 was made a blind alley. Learning maze F after learning maze A was similar to learning four verses of poetry and then having to say verses 1, 2, and 4. Three criteria were used to measure the effect of eliminating section 3 in maze F. All three measures showed this section to be interfering in the learning of maze F, yet there was a 19 per cent transfer from maze A to maze F. On the basis of this result, the author concluded that the transfer effect is a composite process consisting of both positive and negative elements, and that the final result will be determined by the predominance of one or the other of these elements.

The results of the foregoing experiment prove that there is positive transfer from one sensorimotor material to another; but it can hardly be said that these results favor the doctrine of formal discipline. Although maze A aided in the learning of the other five mazes, one would hardly be justified in claiming that the mental functions involved in mastering maze A were so improved through this experience that the subjects could better learn all other maze patterns. Was it not shown that the degree of transfer varied from 77 per cent to only 19 per cent? In the instance of the smallest degree of transfer, an interfering element was proved to be present. It is highly probable that a maze could be constructed with so many negative elements that maze A would interfere in its mastery. This experiment also proved that the degree of transfer is determined in part by the second learned activity. Maze A was not equally valuable as an aid in attacking the other mazes. This fact implies that the study of Latin may be more efficacious for doctors or ministers than for lawyers or businessmen. Formal discipline has maintained that the first learned activity, the subject studied, so improves the faculties that the person will benefit in whatever line of future work he engages.

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[4] L. W. Webb, "Transfer of Training and Retroaction," *Psychological Review Monographs,* XXIV, No. 104 (Princeton, N. J.: Psychological Review Company, 1917).

Perceptual materials. Many experiments have been made with perceptual materials, such as measuring the benefit of estimating one length of line upon one's ability to estimate lines of different length, or of estimating areas of one size upon the success of estimating areas of different sizes. Most of these experiments have little significance for teachers. However, some experiments by E. L. Thorndike and R. S. Woodworth have had considerable influence on educational thinking. As a result of his studies in this field, Thorndike developed his Theory of Identical Elements to explain transfer.

Memory materials. Experiments dealing with memory materials are many. An English psychologist by the name of Sleight has made one of the best experiments in the field.[5] He tested the effect of memorizing poetry, tables, and prose substance upon the ability to memorize dates, nonsense syllables, poetry, prose (literal), and prose (substance) letters. The results of this experiment were extremely varied. Little or no transfer was manifested in some instances; in other instances, a small amount of positive transfer occurred; whereas in still others, negative transfer resulted. On the basis of his elaborate work with transfer in memory materials, Sleight made a number of conclusions, two of which are mentioned because they are quite contrary to the assumptions of formal discipline. These two conclusions are:

> 1. There appears to be no general memory improvement as the result of practice, nor any evidence for the hypothesis of the general memory

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[5] W. G. Sleight, "Memory and Formal Training," *British Journal of Psychology*, IV, Nos. 3 and 4 (1911), 386-457.

function. 2. There would seem instead to be a very large number of related and unrelated memory functions of a more or less complex kind.

Although a number of investigators using memory materials have found a considerably higher degree of positive transfer than did Sleight, the results do not prove that extensive practice produces any general improvement in memory. The memory function is a complex process, and the transfer results depend more upon the specific activity exercised and its relation to the memory activity to which it is transferred.

Reasoning materials. It appears to be rather difficult to perform experiments on transfer with this type of material. Nevertheless, several interesting experiments have been made in this field. One experimenter used school children to determine the value of training to solve arithmetical reasoning problems in solving other logical problems.[6] Two groups of children were given certain logical tests. Then one group was trained for ten weeks in arithmetical reasoning. The other group carried on its ordinary school work without emphasis upon arithmetical reasoning. According to the author, the practiced group did 30 per cent better in logical reasoning than did the unpracticed group. Thus, it can be assumed that training in arithmetical reasoning can be carried over in a helpful manner to solving other logical problems.

A somewhat different kind of experiment to test the transfer value of learning to reason was made by Barlow.[7] He claims that skill in reasoning is improved by teaching definite methods of reasoning. He trained one group of seventh- and eighth-graders how to analyze verbal problems and how to state general principles. He found that this training resulted in substantial gains on reasoning problems that were quite different in content from those used during practice.

Another investigator[8] tested the value of a course in geometry for training in reflective thinking. He discovered that, if definite methods of reflective thinking were stressed in the learning of geometry, there would be a resultant improvement along such lines in other learning situations. If the course in geometry was taught with no such emphasis, no general improvement in reflective thinking resulted.

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[6] W. H. Winch, "Transfer of Improvement in Reasoning in School Children," *British Journal of Psychology*, XIII, No. 4 (1922), 370-381.

[7] M. C. Barlow, "Transfer of Training in Reasoning," *Journal of Educational Psychology*, XXVIII (1937), 122-128.

[8] G. Ulmer, "Teaching Geometry to Cultivate Reflective Thinking: an Experimental Study with 1239 High School Pupils," *Journal of Experimental Education*, VIII (1939), 18-25. For an interesting discussion of transfer and productive thinking, see H. G. Birsh and H. S. Rabinowitz, "The Negative Effect of Previous Experience on Productive Thinking," *Journal of Experimental Psychology*, XLI (1951), 121-215.

Ideals. There have been several experiments with ideals. One teacher emphasized neatness and accuracy in arithmetic papers to a third-grade group of children.[9] The arithmetic papers were scored for accuracy and neatness, and improvement was noted along both lines. Nothing was said to the children about being neat in their other papers. However, their papers in spelling and language were scored for neatness and accuracy, and neatness and accuracy had decreased rather than improved in these papers. In another investigation, great emphasis was placed upon neatness in all papers handed in, and the children were told the advantages of neatness in other aspects of life inside and outside of school. In the other studies of these children, nothing was said about neatness. The papers were rated for neatness, and improvement was noted in classes other than those in which neatness had been emphasized. The author concluded that ideals can transfer.

School subjects. Several experiments have tested the transfer value of elementary-school subjects. Large claims have been made for the disciplinary value of studying formal grammar. One student analyzed these claims, and then made fifty-four tests to measure these abilities.[10] Two groups of seventh-grade children were equated in intelligence. The tests were then given to both groups. Next, group one studied grammar for three months, while the other children studied language and composition. At this time, the tests were again administered. Then group one studied language and composition for three months, and group two studied grammar. At the end of this three-month period, the tests were again given to both groups. The grammar groups improved in only one of the abilities measured, the ability to see likenesses and differences.

Does training in arithmetical computation transfer in such a manner as to show an improvement in arithmetic reasoning? An English experimenter selected two groups of ten-year-old students who were equal in their ability to solve reasoning problems in arithmetic.[11] One group practiced arithmetic computation thirty minutes a day for ten days; the other group practiced drawing. At the end of the ten days both groups were tested for arithmetical reasoning ability, and both groups did equally well. On the basis of these results, the author concluded that students may study arithmetical computation without any guarantee of improvement taking place in reasoning in arithmetic.

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[9] W. C. Bagley, *Educational Values* (New York: The Macmillan Company, 1911), p. 189. See also W. C. Ruediger, "Indirect Improvement of Mental Functions Through Ideals," *Educational Review*, XXXVI, No. 4 (1908), 364-371.

[10] T. H. Briggs, "Formal English Grammar as a Discipline," *Teachers College Record*, XIV, No. 4 (1913), 1-93.

A much larger number of studies have been made in an effort to determine the transfer value of high-school subjects. One study, using over 8,000 students, attempted to determine the effect of a year of study in high school upon the improvement of intellectual activity, as measured by a very elaborate intelligence test given one spring and a second form of the same test administered a year later.[12] The students showed a gain of 23 points on the second test. Approximately 50 per cent of the gain was due to the previous experience in taking the first test, and about 50 per cent to the high-school course pursued for a year. Certain groups of subjects appeared to contribute more to the gain than did certain other groups. The highest 1 per cent of the students in initial ability on the first test gained 20½ points, while the lowest 1 per cent in initial ability gained only 1½ points. On the basis of these latter results, the author claimed that the intelligence of the students was a larger contributing factor to improvement than were the subjects studied in high school for a year.

A more recent study endeavored to determine the transfer value of high-school subjects to intelligence by obtaining measures of correlation between intelligence test scores and achievement test scores at the beginning and the end of the school year.[13] The author of this study also used a measure of the significance of differences between the correlations as an indication of the presence of transfer.

Many studies have been made in an endeavor to determine the transfer value of a specific high-school subject. Many individuals have assumed high-school mathematics to have large disciplinary values.

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[11] W. H. Winch, "Further Work on Numerical Accuracy in School Children: Does Improvement in Numerical Accuracy Transfer?" *Journal of Educational Psychology*, II, No. 5 (1911), 262-271.

[12] E. L. Thorndike, "Mental Discipline in High School Studies." *Journal of Educational Psychology*, XV, No. 1 (1924), 1-22, 83-98.

[13] A. G. Wesman, "A Study of Transfer of Training from High School Subjects to Intelligence," (Teachers College Contributions to Education, No. 909 [New York: Bureau of Publications, Teachers College, Columbia University, 1945]).

One student found that a course in descriptive geometry transferred 32 per cent to other geometrical materials, but only 7 per cent to nongeometrical materials.[14] Does taking work in science improve one's ability in careful observation? A teacher of botany measured students' ability to observe, and then trained them for a period of time in observing botanical materials. The amount of transfer from this training was 33.9 per cent to other botanical materials and 5.4 per cent to nonbotanical materials.[15]

The classical investigation, which was carried on from 1921 to 1924, endeavored to determine the value of studying Latin. This investigation stimulated a number of experiments on the transfer problem as it concerns Latin. In addition to these studies, several others have been made with Latin. It has been demonstrated that high-school freshmen who studied Latin for a year gained in a knowledge of English words of Latin origin about 2½ times as much as did freshmen who did not take Latin.[16] Latin appears to transfer somewhat to the improvement of reading: those students who studied Latin for a year gained more in reading ability than did non-Latin students.[17] Experiments have shown that the study of Latin causes an improvement in students' knowledge of the English language about 10 per cent higher than the improvement of those not taking Latin.[18] Latin increases the ability to spell words of Latin origin, but the transfer is negative in relation to spelling words of non-Latin origin.[19] Students who have studied Latin and then study French or Spanish have an advantage at the beginning of the latter study over students who come to French or Spanish without any knowledge of Latin. However, this advantage lasts for only about one semester. After that time both the Latin and non-Latin students do equally well in the study of modern languages.[20]

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[14] H. O. Rugg, "Experimental Determination of Mental Discipline in School Studies," *Educational Psychology Monographs*, No. 17 (Baltimore: Warwick & York, Inc., 1916).

[15] N. P. Hewins, "Doctrine of Formal Discipline in the Light of Experimental Investigation," *Educational Psychology Monographs*, No. 16 (Baltimore: Warwick & York, Inc., 1916).

[16] E. L. Thorndike and G. J. Ruger, "Effect of First Year Latin Upon a Knowledge of English Words of Latin Derivation," *School and Society*, XVIII, No. 453 (1923), 260-270.

[17] E. L. Thorndike, "Effect of First Year Latin Upon Ability to Read English," *School and Society*, XVII, No. 424 (1923), 165-168.

[18] E. L. Thorndike and H. A. Ruger, "Gains Made in Ability in English by Pupils Who Study Latin and Those Who Do Not," *School and Society*, XVIII, No. 467 (1923), 690.

[19] W. W. Coxe, "Influence of Latin on the Spelling of English Words," *Journal of Educational Research*, VII, No. 3 (1923), 244-250, and IX, No. 3 (1924), 223-233.

Some studies have been made that attempt to test the transfer value of French in studying English.[21] French aids somewhat in increasing the rate of reading English. English sentence structure and vocabulary are improved very little by the study of French. Teachers of French should meet this challenge by improving their methods of teaching so that larger transfer values will result.

Many other studies on the problems of transfer have been made. However, this sampling of the experiments will give the student or teacher some idea of the extent and vigor of the attack on the problem. At this point it will aid the student if consideration is given to other aspects of the problem.

General consideration of the evidence

Authors of the studies referred to above have been concerned with proving the fact of transfer. The illustrations selected did show transfer. In summarizing the results from all the experiments from 1890 to 1935, Orata states that 28 per cent show considerable transfer; 48 per cent, appreciable transfer; 9 per cent, very little transfer; 3.6 per cent, no transfer; 7.2 per cent, transfer and interference; and 3 per cent, interference.[22]

On the basis of all of this experimental evidence, one can conclude with confidence that positive transfer does take place. This fact has been proved again and again by many experimentations under varying conditions. One should be careful at this point, however, and not jump to the conclusion that formal discipline has been proved experimentally. It must also be remembered that absence of transfer and negative transfer have been proved in several experiments. Furthermore, the degree of positive transfer varies from a very slight amount to 92.9 per cent. It has been estimated that 5.4 per cent of the experiments prove that the degree of transfer varies with the conditions under which the experiments were made. These last-mentioned facts hardly fit in with the theory of formal discipline.

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[20] L. E. Cole, "Latin as a Preparation for French and Spanish," *School and Society*, XIX, No. 491 (1924), 618-622; and J. J. Kirby, "Latin as a Preparation for French," *School and Society*, XVIII No. 463 (1923), 563-569.

[21] C. Woody, "Influence of the Teaching of First Year French on the Acquisition of English Vocabulary," *Studies in Modern Language Teaching* (*Modern Foreign Language Study*, XVII; New York: The Macmillan Company, 1930), pp. 146-179; and O. H. Werner, "Influence of the Study of Modern Foreign Languages on the Development of Desirable Abilities in English," *Studies in Modern Language Teaching* (*Modern Foreign Language Study*, XVII; New York: The Macmillan Company, 1930), pp. 97-145.

[22] P. T. Orata, "Transfer of Training and Educational Pseudo-Science," *The Mathematics Teacher*, XXVIII, No. 5 (1935), 267.

With all of these facts before him, no intelligent teacher should be willing to assume tacitly that the subject he teaches, in and of itself, is having the wonderful effects that formal discipline has assumed that certain subjects do have. On the other hand, the teacher should be concerned with whether or not his subject has large or small value to students in meeting other situations of life, no value, or even negative value to students solving certain problems. Such considerations force one to raise the question of the possibility of improving learning conditions in the classroom so as to increase the degree of positive transfer of the subjects being taught there. A number of experiments make some contribution to the solution of this problem.

Conditions of improving transfer. One experimenter endeavored to test the transfer value of training in the *methods* of memorizing.[23] He administered certain memory tests to three groups of students. One group received no training in memorizing. A second group memorized poetry and nonsense syllables. The third group spent 43 per cent of its time listening to instructions on how best to memorize, and the remainder of the time memorizing poetry and nonsense syllables. At the end of the training period all three groups were again given the memory tests. The second group did very little better than the first group. The third group, having received an emphasis on methods, showed a considerably larger gain in the second test than either of the other two groups. This experiment proved that instruction in the *methods* of learning will considerably increase the degree of positive transfer when students have to master similar materials in a comparable situation.

Another experimenter wished to measure the value that training to define scientific words has for defining ordinary words.[24] Three groups of students were used. The ability of each group to define ordinary words was measured. Group A, the control group, received no training. Group B was trained for a time in a routine method of defining scientific terms. Group C devoted thirty minutes of its training period to instruction in the technique of definition and to an understanding of the process of defining. Group B profited very little from its training. Group C, however, showed marked improvement in defining ordinary words as shown by a significant reduction in the number of errors in their definitions. Again, instruction in *methods* of meeting a situation proved to be significant in increasing the amount of transfer.

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[23] H. Woodrow, "The Effect of Type of Training upon Transference," *Journal of Educational Psychology*, XVIII No. 3 (1927), 159-172.

[24] G. P. Meredith, "Consciousness of Method as a Means of Transfer of Training," *Forum of Education*, V, No. 1 (1927), 37-45.

Evidence has been produced to prove that students' knowledge of English words of Latin origin can be considerably increased by giving special attention to such material during the teaching of Latin.[25] One group of students was taught Latin in the ordinary way. In the classwork of the second group, ten minutes a day was given to the history and derivation of words of Latin origin. After a period of time, gains in the vocabularies of Latin derivatives of the two groups were measured. The second group gained about twice as much as did the first group. Another study dealt with the same problem, but in addition tried to discover if equally good results could be obtained by students studying English without Latin.[26] The group studying Latin with special emphasis on Latin derivatives showed decidedly the largest gain.

Two groups of boys were taught to shoot a target 12 inches under water.[27] One group was given an explanation of the principles of refraction of light under water. The other group was given no such instruction. In shooting at the target 12 inches under water, both groups did equally well. Now the target was shifted to 4 inches under water. At this depth the instructed group did much better than the uninstructed group. One of the authors of this experiment claimed that the instructed group generalized its knowledge of the principles of refraction of light under water to targets at different depths. Hence, when the target was changed from 12 to 4 inches under water, this group adjusted to the new situation much more readily.

At a later date this experiment was repeated, having the boys shoot at targets 6 inches and then 2 inches under water.[28] The results from this experiment confirmed the results found by Scholckow and Judd.

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[25] A. A. Hamblen, *An Investigation to Determine the Extent to Which the Effect of the Study of Latin upon a Knowledge of English Derivatives can be Increased by Conscious Adaptation of Content and Method to the Attainment of This Objective*, Ph.D. thesis (Philadelphia: University of Pennsylvania, 1925).

[26] R. I. Haskell, *A Statistical Study of the Comparative Results Produced by Teaching Derivations in the Ninth Grade Latin Classes and in the Ninth Grade English Classes of Non-Latin Pupils in Four Philadelphia High Schools*, Ph.D. thesis (Philadelphia: University of Pennsylvania, 1923).

[27] O. Scholckow and C. H. Judd, "The Relation of Special Training to General Intelligence," *Educational Review*, XXXVI, No. 1 (1908), 28-42.

Fifty-two classes of second-grade children were used in an experiment to determine the transfer effect of instruction in three types of two-place addition numbers to tasks involving addition and subtraction of two- and three-place numbers.[29] Four different procedures were employed. Group A practiced without specific instructions. The other groups practiced, but their methods of instruction varied. Group B was taught to generalize the process consciously and formulate a general method of procedure applicable to other types of problems. Group C was taught by a method called *rationalization,* which means understanding the underlying principles of the process. Group D was taught a combined method of generalization and rationalization. Groups A and C obtained an equal amount of positive transfer, around 60 per cent. The percentage of transfer in the case of Groups B and D was about 72 per cent. Whenever the generalization method was taught, the transfer was increased about 20 per cent. These results pointed to the conclusion that, in teaching arithmetic, it is not adequate simply to teach the facts and processes; students must be taught how to apply these facts and processes to other phases and problems of arithmetic—that is, to generalize the procedure to a variety of problems in which it is usable.

The attitude students have toward the matter of transfer at the time of possible transfer of an experience has been shown to be of considerable significance in increasing the amount of positive transfer.[30] The significance of this factor was tested in three instances. Two groups of students were used each time; both groups were given the same training. The experimental groups at the time the transfer was ready to be made were given certain instructions that the other groups did not receive. In the first case, the students were told to use the method of study they had acquired while learning the materials of certain paragraphs. In the second instance, the students were instructed to use their knowledge of Latin in determining the meanings of the words in the test they were about to take. In the third case, the students were instructed to use their recently acquired knowledge of description geometry in answering the questions in the tests about to be given. In all three cases the students in the experimental or instructed groups showed a significantly higher degree of positive transfer than the uninstructed groups. The authors of this experiment admitted that other factors affecting the degree of transfer were probably present, but they maintained that the attitude of readiness set up by the instructions given was of considerable significance. If the amount of transfer can be increased so readily by such simple devices as were used in this experiment, certainly the classroom teacher can find many ways, if he is vitally interested in doing so, of increasing the transfer value of the materials he is teaching.

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[28] G. Hendrickson and W. H. Schroeder, "Transfer of Training in Learning to Hit a Submerged Target," *Journal of Educational Psychology*, XXXII (1941), 205-213.

[29] J. R. Overman, "An Experimental Study of the Effect of the Method of Instruction in Transfer of Training in Arithmetic," *Elementary School Journal*, XXXI, No. 3 (1930), pp. 183-190.

[30] M. F. Dorsey and L. T. Hopkins, "The Influence of Attitudes Upon Transfer," *Journal of Educational Psychology*, XXI, No. 6 (1930), 410-417.

One would suppose that the degree of mastery of the material learned is one condition that affects the amount of transfer. This is equivalent to saying that one has to learn a subject before he can use it in another situation. A few studies have been made in an endeavor to determine what significance the degree of mastery of materials has upon the degree to which those materials can be used in other situations. One author tested the effect of learning syllables on the mastery of similar and different syllables.[31] The transfer effect of the degree of mastery was determined by repeating the first learned syllables 2, 6, and 12 times. In the case of 2 repetitions, the material was slightly learned; in the second instance, the syllables were almost learned; and then they were completely learned. The conclusion drawn from this study was that the degree of positive transfer is proportional to the degree of integration of the first-learned material, and that in learning to make an old response to a new stimulus a marked degree of positive transfer results when the integration of the initial learning is complete.

Much interest is displayed nowadays in the question of the application of knowledge. What is the relation of the amount of information a person possesses to his ability to apply his knowledge? A study was made that attempted to discover the relation between the amount of information possessed in several fields of science and the ability to pass accurate judgments on scientific problems of everyday life.[32] Groups of eighth-grade, ninth-grade, and junior-college students, as well as adults and elementary- and high-school teachers, took part in the experiment. The groups had received varying amounts of training along scientific lines. The author drew several conclusions that have some significance for the problem of transfer of training. (1) One's ability to apply knowledge is not directly proportional to one's knowledge of facts. (2) The presence of prejudice or superstition decreases the application of facts. (3) Scientific interest stimulates acquisition of knowledge but does not affect ability to apply knowledge. These statements lead one to surmise that, in addition to facts themselves, the application of those facts has to be taught. Applying information is an example of the transfer of information and experiences. This study concluded with the following important statement:

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[31] R. W. Bruce, "Conditions of Transfer of Training," *Journal of Experimental Psychology*, XVI, No. 3 (1933), 343-361.

[32] E. B. More, "A Study of Scientific Attitudes as Related to Factual Knowledge." *School Review*, XXXVIII, No. 5 (1930), 379-386.

> When the facts are known, the fewest errors are made in the situations in which a person had the most experience. It follows then that the methods in the teaching of science should present facts and principles in relation to as many of the important situations in daily life as possible.

The two last-mentioned studies become very significant when one considers the proven fact that so many of the subjects learned in school are relatively soon forgotten. Perhaps the cause of such results is the slight or partial learning of school materials. It is hardly possible for students to have much success in transferring experiences that are so slightly mastered. The teacher can assure himself of larger transfer values by working out methods that result in a more complete learning of the school subject taught. It is highly probable that the teacher is justified in assuming that one of the best ways of more nearly completely learning a certain body of subject matter is to teach its application to as many situations as possible.

A sufficient number of studies has been cited to convince anyone that the degree of positive transfer is affected by a variety of conditions, and that the teacher can increase the transfer value of his subject by giving due heed to these conditions. It has been proved that the methods used in learning, the methods of instruction employed, the attitude of the learner at the time the transfer is to take place, the generalizing of an experience, and the degree of mastery of material are all extremely effective in increasing the degree of positive transfer. All of these conditions are usable in the classroom. Certainly, a good teacher will want to make use of all possible procedures that increase the value of the subject he is teaching.

The most significant generalization that can be made after a review of the experiments on transfer is that if one simply attempts to prove the fact of transfer without any particular attention to the conditions affecting transfer, a relatively small degree of transfer is likely to occur. On the other hand, if one pays attention to the conditions affecting transfer, and deliberately works to enhance the transfer values, the degree of transfer can be increased to a very marked extent. The foregoing statement is equivalent to saying that if a teacher teaches the facts of arithmetic only, that is about all the children learn. However, if he also teaches children to apply the facts of arithmetic to a variety of situations, they will learn to transfer their arithmetic experiences to various aspects of their lives. This last statement emphasizes the oft-repeated saying of psychologists, "Learn the materials in the way you expect to use them, for the children learn to do exactly what they do." Applied to the problem of transfer, this principle means that the children must be taught to transfer the experiences of the classroom if the teacher expects them to be able to carry on that type of activity in situations outside the classroom.

How does transfer take place?

A large majority of the experiments cited in this chapter show some kind of transfer. Many of the experimenters have attempted to explain how transfer takes place. They have endeavored to get at the cause or causes of transfer. Such explanations have much significance for school people. If the teacher knows what causes transfer, he can tell better how to set up conditions in his teaching that give the causes a chance to become operative in the experiences of his students. Have the investigators been able to point out the causes of transfer? The two most widely known explanations will be presented in an attempt to answer this question.

One of the earliest explanations was offered by Thorndike in his Theory of Identical Elements. He maintained that one mental function alters any other only insofar as the two functions have identical elements as factors. He also cited the use of the same neural bonds in the two situations as the cause of transfer. Many other writers have employed the idea of identical elements as the cause of transfer. Some have simply stated the explanation in a general claim for identical elements. Others have given their explanation in terms of identity of content, identity of procedure, and identity of aims or ideals.

The other often-mentioned explanation is known as the Theory of Generalization. Judd, the author of this theory, maintained that transfer takes place in a person to the extent that he generalizes his experiences. He derived the theory from the experiment in which boys shot at a target under water. The boys who had been given the explanation of the principles of refraction of light under water did better when the target was changed in depth from 12 to 4 inches because they had generalized their knowledge of the principles of refraction by applying them to targets at varying depths. A large number of writers have used this theory as the basis of their statements as to the cause of transfer.

These two theories hardly answer the query as to the cause of transfer; they merely appear to be descriptions of where and how transfer may take place. One would hardly expect an experience with arithmetic to transfer to a situation where no numerical relations are involved. If Latin transfers, it should be to other language situations and not to purely mechanical experiences. One generalizes an experience by transferring it to a variety of situations to which it is applicable.

At the present time there is no adequate theory of the cause of transfer. However, the two theories mentioned above do have considerable practical significance. The theory of identical elements emphasizes that an experience can be transferred only to similar situations, where some of the elements of the first experience are applicable. The theory of generalization of experiences stresses the significance of transferring an experience to as many similar situations as possible in order to understand its applicability to all such situations.

A brief survey has been made of scientific attempts to solve the problem of transfer of training. The scientific attack on the problem has large value, but no one can maintain that the problem is adequately solved, for neither the varying conditions that affect the degree of transfer nor the causes of transfer are known as yet. However, the teacher should not be discouraged, because the problem is not primarily a scientific or theoretical one for him, but mainly an *educational* problem. The teacher is concerned with the question of obtaining the largest possible value from the experiences he is giving students by teaching them to make the largest possible application of these experiences. These statements lead to a consideration of the following topic.

The meaning of the scientific results for the teacher

Although it is true that the problem of transfer of training has not been completely solved by the application of scientific techniques, the results are sufficiently convincing to have a considerable meaning for teachers. Anyone who is genuinely interested in the problems of teaching will find that these results have significance for his thinking about educational problems. These results are very valuable in enabling him to improve his teaching methods and procedures.

In the early part of this chapter, a statement was quoted from Mursell to the effect that one's attitude toward the problem of transfer determines his attitude toward teaching. A teacher who continues to hold to formal discipline as a basis for thinking about educational problems will be inclined to do some of the following things. He will defend the privileged position of certain subjects in the curriculum. He will justify the fact that these subjects are required of all students on the grounds that they discipline the mind. Such an argument has often been heard in defense of requiring all high-school or college students to study a foreign language, mathematics, or some one science. This teacher is likely to make the subject he is teaching unduly difficult for his students, arguing that it is the study of the subject itself that has value, and that the harder the task, the more disciplined the mind becomes in attempting to meet that task. Again, this teacher, in arguing for the disciplinary value of the study of the subject itself, will ignore interest and motivation, for interest makes the task easier to learn and hence less discipline will result. On the same basis, the introduction of modern methods of teaching will be ignored or resisted. As long as one thinks the value lies in the subject itself, methods of teaching it are irrelevant, for the desired results will be obtained by coming into contact with the subject matter of the course regardless of the method employed.

Should a teacher refuse to be guided in his thinking by the concept of formal discipline, he will immediately become interested in the direct values of the subject he is teaching. He will also be interested in its indirect values. For example, the Latin teacher will be primarily interested in teaching his students to read Latin; he will also look for the largest number of values that Latin may have in the other language experiences of his pupils, and he will teach his students how to apply Latin to these other language situations. Such a teacher will no longer think of the mind of the child as made up of faculties of memory, reasoning, and the like, but will consider the child's mind a unit that organizes its varying experiences into patterns of behavior that will enable the child better to meet the situations of his life; the good teacher will want to aid the pupils to organize the best patterns of behavior. This teacher will become vitally interested in children. What is best for the varying needs of his students now has first place in his thought; the subject being taught has secondary consideration. All subjects become means toward obtaining valuable ends; all subjects are tools that aid the students to secure certain recognizable values.

Such a position compels a teacher to be concerned with all that modern psychology has to offer on the learning processes that go on within pupils while they are acquiring the experiences of the classroom. Interest and motivation are all-important in helping the teacher to facilitate the learning of his students. Modern methods and procedures are extremely significant to this type of teacher, for he wants to know every procedure that will enable him to help the children obtain the greatest values from their experience and contacts with him.

This point of view does not mean that a teacher will not be interested in teaching his students to work hard. He will believe in hard work, but not just for its own sake. He will teach pupils to work hard in order to obtain the largest possible direct and indirect values of the experiences that are being given to them.

It has already been emphasized that the modern point of view in regard to transfer of training places a great deal of importance upon methods and procedures.

The first thing school people need to do is to decide what values they want to see realized in the lives of the students both in and out of school. What habits and methods of organizing experiences are most worth-while? What ideals, attitudes, appreciations, interests, and motives are of greatest significance? After these objectives have been derived, what knowledges and skills will be most effective in realizing them? The determination of the methods and techniques that will aid the most in realizing these ends becomes the all-important issue.

Classroom methods should be worked out in the light of the so-called Laws of Learning. In the elaborate experiments by Thorndike testing these laws, the most significant result was that repetition in and of itself is not significant. The Law of Effect, however, was proved to be highly important. It is the *kind* of repetition that counts. Practically, these results mean that the mere repetition of certain subject matter will not produce the momentous outcomes that have been claimed by the advocates of formal discipline. In order to attain the direct and the transfer values of the subject being taught, the teacher will have to set up in the classroom a situation that will motivate the learners. The teacher should seek to get the pupils to want the values that the procedure was set up to effect.

Too often teachers have worked on the principle that the fixing of habits is a desirable educational outcome. That is exactly what will happen under such a method of teaching. The students learn to repeat the materials in the particular situation of the classroom and are unable to apply them when opportunity is offered elsewhere. The situations of life are constantly changing, highly variable. This means that pliability, not rigidity of habits, and skills should be the end sought, and that classroom procedures should be organized accordingly.

For example, a high-school youngster asked his parent to let him repeat certain rules in algebra that had been assigned to be memorized. The child asked whether he had repeated the rule correctly. The parent replied that he had.

"Every word?" said the pupil.

"Not every word, but you stated all of the essential ideas."

"I have to say it with every word just as the book has it or the teacher will give me no credit."

This teacher did not seem to realize that an overemphasis on the exact wording of the book worked toward establishing within the child a rigidity of habit that interfered with his fully understanding the principle and being able to apply it to variable situations where it would be needed.

Such a teacher needs to become aware that understanding the meaning of rules rather than remembering their exact language is the more important outcome of his teaching. This teacher should become acquainted with the work of Katona, in which some experimental evidence supports the idea that much more transfer value is possible when material is learned in an understanding manner.[33] Katona stresses very strongly, in the discussion of his experimental results, the value of learning with understanding for transfer effect.

This teacher would do well to read "Learning and Instruction," Forty-ninth Yearbook, Part I, especially the chapter on the general nature of learning, in which an excellent description of learning, emphasizing such matters as learning and maturation, learning and experience, and the direction and guidance of learning, is presented.[34]

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[33] G. Katona, *Organizing and Memorizing* (New York: Columbia University Press, 1940), chap. 5, pp. 108-136.

[34] G. L. Anderson and A. I. Gates, "The General Nature of Learning," Forty-ninth Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press, 1950), pp. 12-35; also, in the same volume, W. A. Brownell and G. Hendrickson, "How Children Learn Information, Concepts and Generalizations," pp. 92-128, and R. L. Thorndike, "How Children Learn the Principles and Techniques of Problem Solving," pp. 192-216.

He would also do well to read the chapter on how children learn information, concepts, and generalizations, and also the chapter on how children learn the principles and techniques of problem-solving. In these pages one will find strongly emphasized the need and importance of the teacher's coming to have a clear understanding of what psychology has revealed about the learning processes of children, and how necessary it is for him to direct the learning of his pupils so that the meaning of information will be acquired, broad concepts and generalizations will be developed, and the use of these experiences in solving problems in and out of classroom will be learned. If this teacher really understands these three chapters he cannot continue to believe that fixing exact details of knowledge in the student's memory will give such wonderful learning outcomes as have been claimed by adherents of the theory of formal discipline.

McGeoch emphasizes the above-mentioned points in their relation to transfer of training:

> The learning of complex, abstract, meaningful materials and the solution of problems by means of ideas (reasoning) are to a great extent functions of transfer. Where the subject sees into the fundamental relations of a problem or has insight, transfer seems to be a major contributing condition.[35]

Undue emphasis upon rigid grammar in the study of language may hinder the student in meeting adequately the highly variable situations involved in reading a language. Better results would probably be obtained by using a method that taught the students to deal fluently with the changing meanings in reading, employing grammar in this situation or that to clarify the meanings of the material being read. Several studies have shown that a knowledge of English grammar is more valuable in the study of a foreign language than it is in an understanding of English.[36] Something is radically wrong in a situation of this kind. Teachers have taught grammar by a method that produces a large transfer to foreign languages but only a relatively small degree of transfer to English. Such results suggest a much needed change in the procedures of teaching grammar.

The teacher of science should be mainly concerned with the use the students make of the materials covered in his course. If this is to be accomplished, something more than merely teaching the facts of science in a routine manner must be done. Strong claims have been made for the value of science in training students to think scientifically and in developing in them a scientific attitude toward the problems of life. There is no guarantee that such results will be obtained unless teachers of science devise methods that stimulate students to carry over the materials of the science course to a solution of a great variety of problems that arise in everyday life. The following incident illustrates the lack of transfer value of an intensive study of science. A friend visited a very eminent scientist one evening. Many problems of science were discussed. The friend's interests were so aroused, he was so intrigued by the profound insight and keenness of thought of the great scientist, that the conversation lasted until the wee hours of the morning. A few evenings later, the two were together again at a meeting in which a very difficult social problem of the community was being discussed. The great scientist left his science in his laboratory and his keen methods of thinking in his study. He attacked the social problem in an emotionally biased and prejudiced manner; he used a method of thinking that any ordinary, ignorant man of the street might employ, a procedure in which any educated man should be ashamed to indulge. The friend came away from the meeting disillusioned and saddened by the fact that the study of science had failed to exert a broadening educational influence upon his friend. Science is not to blame for such results, but rather the methods employed in teaching science.

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[35] J. A. McGeoch, *The Psychology of Human Learning* (New York: Longmans, Green & Co., Inc., 1942), p. 446.

[36] J. W. Shaffer, "Modern Language Student vs. English Grammar," *Modern Language Journal*, XIV, No. 2 (1929), 95-102; D. Starch, "Measurement of Efficiency in English Grammar," *Journal of Educational Psychology*, VI, No. 10 (1915), 615-626; and E. R. Coverley, "English Grammar and Foreign Language Failure," *Education*, XLVI, No. 10 (1925), 612-616.

Numbers and number relations have played a large part in the development of civilization, and they continue to be important in the life of today. Hordes of students who have studied arithmetic, algebra, and geometry have no understanding and appreciation of the role of numbers. They have been drilled on tables, combinations, and formulas, but have never been taught the significance and meaning of the materials upon which they were drilled. Teachers need to learn that application is part of drill. Drill can be motivated by using materials in a variety of situations while fundamental facts and principles are being learned. It is one thing to teach a student that $3 - 0 = 3$, or that $0 + 3 = 3$. It is another thing to get the student to understand that whenever zero is added to any number the result is not increased. It is still more difficult to get students to understand that in *any* aspect of life, when nothing is added nothing results; in other words, something cannot be got for nothing. Such a principle can be learned; therefore, it can be taught if the proper methods are employed.

The teacher should not be hesitant about teaching his subject so as to increase the transfer values, or fear that by so doing he will lessen the direct values of the materials. The two sets of values are intimately related. This relationship is forcefully stated by Mursell:

> When the ability is most intelligently taught and organized for its own sake, it is thereby taught and organized in such a way as will facilitate transfer; and its converse: When we deliberately work for the transfer of some ability, we facilitate its acquisition in its own right.[37]

In the final analysis, transfer of training is an educational problem. The solution of the problem on an educational level rests in the hands of the classroom teacher. This task of the teacher is beautifully described in the following significant statement.

> Do we want transfer, and if so, what, in terms of ideals, attitudes, beliefs and habits, do we want transferred; and what provision should we make in method of learning and teaching, administration and the like, in order to bring about transfer in the form and amount we desire? . . . First, the teacher should know what it is that she wants the chidren to transfer to other fields, second, she must learn by experience or experiment how to teach for transfer, and third, to go ahead and do it.[38]

Summary

The theory of formal discipline has been described and its influence upon educational practices has been pointed out. Transfer of training has also been described, setting it in contrast to formal discipline. The validity of formal discipline as an adequate educational theory was first questioned by William James about 1890. Since then more than 300 experimental studies on the problem have been made. These studies experimented with the transfer of learning of a great variety of materials, including those of sensorimotor materials (e.g., mazes); perceptional materials (e.g., estimating areas); memory materials (e.g., poetry and prose); reasoning materials (e.g., arithmetical reasoning problems); ideals (e.g., neatness and accuracy); and school subjects (e.g., grammar, Latin, and geometry). The results of these studies have proven that positive transfer, absence of transfer, and negative transfer do take place. The positive transfer results may seem to support the theory of formal discipline, but the fact that the degree of transfer varied from a very slight amount to 92.4 offers little proof. Add to this fact the absence of transfer and negative transfer, and it can be said that the experimental results have given little or no support to the theory of formal discipline. Other experiments have dealt with improving conditions for effecting transfer. It has been shown that giving instructions in the learning of materials and explaining principles and their use affect the amount of transfer. The student's attitude toward transfer and the degree of his mastery of material also affect the amount of transfer.

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[37] J. L. Mursell, *Psychology of Secondary School Teaching* (rev. ed.; New York: W. W. Norton & Company, Inc., 1939), p. 104.

[38] Orata, *op. cit.*, pp. 278, 281.

Several answers have been offered to the question: How does transfer take place? Thorndike gave his Theory of Identical Elements, maintaining that one mental function alters any other only insofar as the two functions have identical elements as factors. Judd expounded the Theory of Generalization. He maintained that transfer takes place to the extent that a student generalizes his experiences. Neither of these theories offers an adequate description of the cause of transfer.

The teacher should realize that the problem facing him is one of practical or educational significance, rather than one that is scientific or theoretical in nature. For him the problem is one of teaching students how to make as large an application of learning experiences gained in one situation to other situations as may be practicable. The teacher must decide what values, ideals, attitudes, knowledge, and skills students are to get in their educational experiences. He must understand how students learn these things most significantly and how they transfer their learnings, and, furthermore, he must consciously teach students how to transfer their learning to a large variety of situations.

QUESTIONS AND EXERCISES

for discussion and study

1. Of what value to teachers is a knowledge of the scientific attack on the problem of transfer of learning?
2. Why do schools continue to teach so much formal grammar when its supposed beneficial effects are not substantiated by experimental results?

3 In this chapter a distinction is made between formal discipline and transfer of learning. Do you think such a distinction is justified? Give reasons for your answer to this question.

4 Enumerate the direct and the transfer values of the subject you teach.

5 List the things you could do to increase the transfer values of the subject you teach.

6 What subjects in the high-school curriculum have sufficient direct functional value to all students to be required for graduation?

7 Assuming that you will give up formal discipline as a basis of your philosophy of education, make a statement of the principles that you will put in its place.

8 A high-school teacher of geometry asked his pupils to read the preamble to the Constitution of the United States to discover the basic assumptions therein. Was this a good assignment in the teaching of geometry? Justify your answer.

9 Give a critical evaluation of the following statements:

a. If all the students in a certain secondary school who had studied geometry were found to be superior in reasoning to those who had not, this would be sufficient evidence to prove that training in geometry was responsible for greater ability in general.
b. The amount of improvement in the capacity in which the student is trained is probably never accompanied by an equal amount of improvement in his other capacities.
c. We may conclude on the basis of experiments in transfer of training that all training is entirely specialized.
d. The study of formal grammar can be justified by the improvement that it produces in reasoning.
e. The transfer effect from any mental function to any other mental function, or from one school subject to any other subject, may be substantially modified by conscious effort in that direction.
f. Students who plan to study French should always have a year or more of Latin as a foundation.

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CHAPTER 18

Learning motor skills and knowledge

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Perceptual-motor development

MOTOR DEVELOPMENT BEGINS IN UTERO at a time when the surface stimuli elicit movements of distant muscles. Previous to this time, stimuli have to be applied directly to the muscle tissue to obtain movement. With the beginning of nerve tissue development, there is "transferred" stimulus—hence, movement in other portions of the organism. From this period on, there are movement responses to stimuli, and growing integration of stimuli situations with satisfactory functioning.

Bodily control begins at the head end of the human infant. The baby learns to hold the head erect, to fixate with the eyes, to reach toward a regarded object, and to grasp it with greater and greater precision. By the time he has gained the ability to reach and grasp, he has probably also developed a crawling method. Posture develops posteriorly until he can sit erect. Posture continues as a part of the developing pattern in crawling, and then in walking. These early elementary motor developments (crawling, prehension, and walking) of infants seem to progress in a similar way regardless of special practice, or of parental encouragement and coaching.

Motor development during the first fifteen months. The sequence of elementary motor development, for the first fifteen months of the normal infant's life, seems to be very much the same from infant to infant. Normal development includes sitting alone, crawling, prehension, and walking. The rate of achievement of these respective developments varies from infant to infant. These variations, unless in an extreme degree, have little significance for prognosis of future traits or abilities.

Eating and drinking skills. The skills involved in the use of utensils for eating and drinking are not easily acquired by the child. It takes the average child about fifteen months to acquire the ability to pick up a cup of liquid and place it to his mouth. The completed skill of drinking from the cup without spilling takes much longer. Eating habits are gradually acquired. They are acquired more rapidly if the child is permitted much practice without forcing, and without much censure for spilling things or "making a mess."

A stimulating environment; guidance. As rapidly as possible, the infant should be exposed to challenging environment that stimulates him to use his developing powers in a variety of ways. What the child needs is equipment, space, opportunities, and help.[1] Blocks and marbles, scooters, roller skates, toy wagons, and the like are often used. Situations that encourage climbing, jumping, running, and swimming foster his development. Skills are frequently facilitated by guidance in new techniques. Interested children prefer to be helped toward successful techniques. Success leads to interest and more opportunities for later practice. Interest, itself, is partly dependent on adequate skill for satisfactory accomplishment. Lack of skill means backwardness, reluctance to participate, and being "left out" (fewer group invitations to participate), hence less chance to "catch up." Moreover, early advantage in learning may mean permanent superiority.

Skill instruction for the preschool child. Experiment with preschool music training (vocal) has indicated that the preschool child is ready to profit from such training. Very early training seems to expand the child's range, develop favorable attitudes and interest that increase later practice, and prevent the acquisition of habits that interfere with later development. The superiority of the trained preschool children over the untrained persists in later school years.[2]

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[1] T. D.. Jones, "The Development of Certain Motor Skills and Play Activities in Young Children" (Child Development Monographs, No. 26 [New York: Teachers College, Bureau of Publications, Columbia University, 1939]).

[2] R. Updegraff, L. Heiliger, and J. Learned, "Part III: The Effect of Training on Singing Ability and Musical Interest of Three-, Four- and Five-Year-Old

The possibilities of development under conditions of suitable environment and parental encouragement are revealed in the early motor-skill development of many primitive peoples. Mead comments that all children among the Manus of New Guinea are expected to swim at three years of age and climb about like young monkeys even before that age.[3] Children of three punt the large canoes. Mead says:

> There is not a child of five who can't swim well. A Manus child who couldn't swim would be as aberrant, as definitely subnormal as an American child of five who couldn't walk.[4]

We seem to have erred in the direction of offering too few opportunities and experiences to the developing child. Children in their second and third year of nursery and kindergarten experience have been reported to be unchallenged and bored by the apparatus and equipment.[5] They tend to lose their enthusiasm for attending; or they attempt to add their own "special features" to the activities in attempts to increase the challenge. The apparatus and skills of the average kindergarten are reported to be geared to the developmental level of the three-year-old.[6]

Skills advance in hierarchies. Just as the child in the crawling stage of development builds his climbing of an incline on the crawling pattern, and as the child of the walking stage builds his climbing on the walking pattern, so the more mature child or adolescent builds his new movement patterns on the basic acquirements and skills that have been previously developed. The learner puts together bits of former movement patterns into new adjustments, much as he puts together bits of former experience in imaginative thinking. As in imagination, his new pattern must be taken from what he has previously experienced, and is limited in the new situation by the fitness of the previously experienced part.

Skill learning is chiefly the integrating of simpler movements into a new pattern for some purpose. Coordinating the hand and foot movements with visual perception in driving an automobile is an example of reorganizing known movements and percepts into a new pattern. Learning to do a folk dance, to execute military drills, to go through a stylus maze without error, and to trace a star outline while

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Children," *Studies in Pre-School Education* (University of Iowa Studies in Child Welfare, New Series), I, No. 346 (1938), 14: 83-131.

[3] M. Mead, *Growing Up in New Guinea* (New York: Mentor Book, The New American Library of World Literature, Inc.), p. 26.

[4] *Ibid.*, p. 27.

[5] M. V. Gutteridge, "A Study of Motor Achievements of Young Children," *Archives of Psychology*, No. 244 (1939).

[6] *Ibid.*

looking in a mirror are other examples of putting together into new patterns bits of perceptual-motor behavior already learned. The problem is chiefly one of selecting and integrating simpler, previously learned movements rather than one of learning new movements. Strengths, speeds, precisions, and endurances continue to develop throughout childhood and early adolescence. But these are largely incidental acquirements accompanying the coordination of movements in skill patterns to fit the child's ideas and purposes. The greater the variety of specific movements and skill patterns the child goes through in his early maturing and developing period, the more likely he is to possess the motor-movement equipment to meet the numerous demands of adult life.

Both school and life require much motor-skill learning. Modern civilization demands speed and precision of movement. Awkwardness is dangerous in many of our industries, in driving through traffic, and even in our rugged sports. Grace and poise are prized socially, and the lack of them is an embarrassment. Grace implies a body so sensitized to movement impulses as to bring about unconscious, perfectly coordinated nicety of control. Social prestige and popularity seem to be somewhat related to one's relative rank in strength and skill acquirements, particularly during the developing years. The child's social maturity seems to be related, to a degree, to his motor development.

A major portion of school time and adult life is occupied by motor activity. School includes writing and drawing; typewriting and shorthand; laboratory work and industrial work; domestic science and manual training; plus sports, games, and physical education. The boy pounds nails, saws boards, digs earthworms, and goes fishing; or plays marbles, ping-pong, and quoits. He carves boats, builds airplanes, collects bugs, and plays ball. The man hunts, fishes, and tries to lower his score in golf or beat his neighbor at tennis and billiards. He raises roses or vegetables, mows his lawn, or does his own car- and house-repairing. He begins each day with all the motor activities of rising, dressing, eating, and driving his car to work. Even the office worker has typewriting, accounting, or chart and blueprint drawing as possible activities. The physician has surgery; the chemist, weighing and measuring. Machinists, carpenters, tradesmen of all kinds, and laborers in all the industries rely on motor skills.

The little girl plays house, dresses dolls, sews on doll dresses, plays jacks, glides about on roller skates, begins to dance, plays tennis and golf, practices on the piano, or goes horseback riding. The woman cooks, sews, bakes, sketches a landscape, hikes unbelievable distances while shopping, plays her favorite sport, or raises her favorite flowers.

Skill improvement depends on intent. Improvement in skill means performing the skill faster or more precisely, or both. But it also may mean performing more gracefully and in an appealing tempo, as in the dance, in figure skating, or in the free exercises of gymnastics. Improvement in a skill depends on *practice with intent to improve.* Without the intent to improve, practice establishes a lower level or, what is more frequent, permits gradual retrogression in level of performance. In general, motivation and purpose, and method and equipment, establish the level of the skill finally attained. The levels are rarely established by any physiological limit of the individual.

Cursive handwriting of the average adult serves his purpose without rating high in legibility or beauty of flowing lines. Skill practice for entertainment and recreation does not imply improvement. Many vocational skills, communication skills, and recreation skills remain at a low level because they serve the individual's purpose at that level. Many of us type at a habitually slow pace or speak with careless syntax and slurred syllables.

Adequate spacing of practice periods has valuable results. Spacing tends to keep the learner free of pressure and worry. Moreover, motor skills seem to grow together to some degree during periods of no practice. The periods between practice seem to etch more clearly the major phases of the skill and dim the nonessentials. Mental rehearsal may bring to the attention points to stress in the next practice. However, the teacher, with his ability to analyze, is more likely to detect the parts needing greater emphasis. The frequency and length of practices for most rapid learning vary with the stage of learning, the complexity of the skill, and the strenuousness of the activity. In general, short daily practices are the most practical for the beginner. Twice-a-day practices of less strenuous skills may be advantageous. The maintenance of great refinement in complex skills seems to require long and frequent practice.

High levels of skill. Skill levels become much higher if the motivation is intense and the rewards are high. Practices at the advanced stages of skill are usually longer. The analysis of performance may be quite detailed. Much time will be spent on polish of parts. The learner acquires the ability to concentrate well, to be quite resistant to distraction. The span between cue perception and motor performance becomes longer;

for example, the reader's eyes are considerably ahead of his voice in oral reading. Likewise the typist or the pianist reads far ahead of the responses of his fingers. More and more, the attention is focused on cues and results with less and less attention on the performance habits.

Retention of skill. High levels of skill performance such as piano playing, conversing in a foreign language, or even putting in golf seem to drop down rapidly during longer intervals without practice. Regular practice, and a pre-performance review of the skill, seem to be necessary to maintain the high level of performance.

Skill lessons for the beginner. The beginner needs the mental image (or idea) of the act but not a detailed analysis of movements. Much of the selection and combination of movements into a pattern to serve the learner's purpose is done without consciousness of the precise selection made. As quickly as the beginner can get the general idea of the act, he should begin his practice trials and revisions. These first individual movements he makes are only partially identified, if at all. They are continually adjusted and changed, anyway, as learning progresses. Only the gross errors need correction at this stage; minor errors are unimportant. Many minor adaptations will be made below the awareness level of consciousness.

Various procedures are used to give the beginner the idea of the skill: for example, demonstrations, directed observation of skilled performers, rapid or slow-motion movies of performances of the skill, diagrams, drawings, still pictures, or sketches. As soon as he seems to have the idea, he should be subjected to lots of active practice. There will be some additional learning by the highly motivated student because of his mental rehearsal between active practices. However, there is no substitute for the physical trials.

The teacher should avoid detailed verbal explanations in the early stages. Word explanations have very little meaning for the beginning learner of a motor skill. Some teachers try to move the child through the pattern—by guiding his hand in writing, for example. Such guidance seems to be helpful only when the learner actively tries to help himself to follow the movement desired. Usually the learner profits more by trying the form-pattern himself, seeing his gross errors, and correcting them as best he can, thereby clarifying his idea of the pattern to a greater extent.

Form. The attainment of a high level of skill necessitates the adoption of a form that employs sound mechanics and which is adapted to the structural and functional characteristics of the individual. Form is the "way to do it," the design of performance, the work method. For the individual, it answers his major question after he has a purpose, namely, how to achieve the purpose most effectively. The individual often adopts a form by imitation. However, there is a diversity of forms among the experts to whom one might look for a model, particularly in the details of the work method.

The teacher may very well guide the student into some form that has proved highly successful for others in the past. For example, the handwriting teacher prescribes the student's posture at his desk, his method of holding a pencil, the angle of the paper; and helps maintain, by the direction, a balance between the student's arm and finger movements. The teacher of typewriting tries to fix the student's body posture, arm, wrist, and finger positions, and keyboard finger habits.

If the learner, through much undirected practice, has already adopted a manner of performing but is handicapped by inefficient habits of form and technique, it may be necessary to start him over again at almost a beginner's level. Although there will be some interference from his inefficient habits, he almost always acquires the more efficient form more quickly than a complete beginner.

Certain characteristics of skill deserve special mention. First, skill is specific to the activity, not a general motor ability. Second, a skill is somewhat general in form of expression, that is, it is never repeated precisely the same way in all details of the movement pattern. Moreover, the well-developed skill is adjustable to changing environmental conditions. Third, the complex skill, even when developed to a high level, fluctuates in efficiency from performance to performance. Variability of performance in the complex skill never disappears. Fourth, the form used in a skill is, to a considerable degree, an individual matter. Differences in body levers, muscle tonus, strengths, speeds, and learning environment vary the form adopted by different individuals performing the same skill. Even experts with similar form will vary in the minutiae of the movements involved.

Although bright students may profit more by verbal directions and may seem to learn motor skills faster, the difference is probably due to the method rather than the *slight* relationship between academic intelligence and motor skill. Strength and physical or social maturity may affect the rate of learning. Before puberty, sex seems to make little difference in ability to learn motor skills. Different physical development, differences in rates of growth, and a somewhat different social milieu may cause differences after puberty both between the sexes and within the same sex.

Perceptual learning

First cues to percepts. At birth, the infant is unable to focus his eyes or perceive objects in his environment. His hearing is dulled by mucus. Tactual stimuli affect him, but his response is "random" activity, a few reflexes, and some withdrawal movements. He gradually begins to focus his eyes, to hear sounds, and to become conditioned to certain adapted responses. The sight of the mother and the sound of her voice become to the child a part of the situation in which certain organic stresses, such as hunger and physical discomfort, are relieved. Feelings of satisfaction ensue. Gradually, pleasurable reactions are conditioned to be direct responses to the sight of the mother or the sound of her voice. This learning to respond to the mother as a result of previous experience is perception. His mother, a part of his total environment, has been organized into a stimulus pattern for a set of responses. She has become a cue to preparatory reactions to feeding, or to other activity productive of feelings of satisfaction. "Cue" is used in the sense of a stimulus pattern that guides activity to the recall or reproduction of part or all of a former experience. The organic urges become the infant's earlier learned cues.

Organizing the sensory field; abbreviated cues. Perception involves fusion of various stimuli. The infant's environment at any one time presents to him a mosaic or complexity of stimuli. Usually, the child is simultaneously receiving stimuli from the auditory, visual, cutaneous, and proprioceptive nerve endings; and like as not, the gustatory and olfactory senses are adding their receptions. The child learns to respond to patterns of stimuli; and later to a bit of that total pattern as if the whole were present. The re-experienced parts call forth responses that were originally elicited by the larger stimulus pattern. The principle is not one of substituting one situation for another as a stimulus, but one of substituting some bit or element of the original total stimulus situation for the whole.[7]

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[7] In terms of Gestalt psychology, a perception is a recognition of field relationships between figure and ground. Such a recognition from reduced cues is termed *closure*, a subjective completion of the whole.

Growth of the perception of the male parent and the verbal symbol for him illustrates this early learning. A large moving object with a rough voice stimulates the infant's sense organs. The large moving object tickles his ribs, gives him peculiar sensations by lifting him high in the air or tossing him about, turns him over a shoulder, and adds sensations of motion to pats on the back when he becomes vociferous with colic. An occasional jab from whiskers mixes into the stimulus pattern. The mother is absent and the same large stimulus pattern furnishes him with a bottle and a change of clothing. Pleasurable reactions become attached to the growing stimulus pattern—this adult. The baby kicks and squirms and makes various sounds with his vocal organs. He utters, "da." The exercise is enjoyable, it gives him an auditory stimulus, and he says, "da," again. The object with the deep voice comes into his field of vision and repeats the "da-da." The infant's efferent speech pattern is not yet quiescent; the stimuli tend to discharge in the direction of the lowered potential of the body-part that has just been active. The auditory stimulus of his own sound of "da" is followed by repeated "da-da" sounds from the deep voice. The infant says, "da-da." again as an outlet for energy aroused by the complex of stimuli. He is rewarded by being picked up, patted, and, in general, "fussed over." The "da-da" has a good start as a conditioned stimulus cue to be attached to this large moving object, deep voice, and the feeling-of-satisfaction responses. After other rewardings of a similar nature, "da-da," or a modification, becomes a conditioned symbol for experience with this adult.

Growth in definiteness of percepts. Other males with deep voices enter the sensory field of the infant. He utters, "da-da," but the results differ. Many repetitions of presentation of satisfying treatment by this one male, and negative results with others, cause an individuation in the particular stimulus pattern. The particular pitch of the voice, the bald head, the mustache, or other sensory cues limit the stimulus pattern that produces the symbol "da-da" to the stimulus object that gives the child the pleasurable reactions and relieves his stresses. By some such process, "dad" may become significant to the youngster.

Conditioning to a nurse, brother, or sister would follow the same principles. The example of conditioning to the male parent illustrates the principles of perceptual learning, but is by no means a typical example. Fear frequently enters the situation of conditioning to the male. Many infants have little opportunity to develop perception of the male until a later stage. Perception, however, develops from just such simple beginnings as these. The infant learns to recognize his bottle, and to say, "bottle," or, "hot," in connection with it. He watches lights and moving objects. He chews his rubber ring and shakes his rattle. He learns to respond in specific ways, either overtly or implicitly, to things in his environment. Annoyances cause him to turn away or withdraw until stimuli are outside his sensory field. Satisfactions keep him in the presence of the stimuli, and result, therefore, in frequent persistence of stimuli.

The infant seems to begin perception by organizing his sensory field into a somewhat vague and indefinite figure. First, he seems to distinguish people from objects; and then familiar people from strangers. His early perceptions of the world around him grow chiefly from his handling and manipulating, exploring, crawling over or climbing over, and the like. He bites, pounds, or throws the object. The object with which he is fed is bright and shiny. He pounds with it, throws it on the floor, and is fascinated by its shine; so the perception of "spoon" grows. He finds a wooly moving object that emits yelps and barks. It runs away and comes back. It paws him and chews his shoe. Thus, the perception of "dog" develops. Objects of his environment give off light, make sounds or movements, are useful to him in his activities, and become attached to his response patterns. His environment is becoming differentiated into perceived objects.

Verbal cues associated with perceptions. The perceived objects are becoming associated with a verbal sound that he can recognize when heard, and which he gradually learns to make himself. By such early conditioning, the perceptions become identified by words. It is important that, as the child develops, he be taught to pronounce word-names associated with perceptions with distinctness and correctness of articulation. This perception of precise pronunciation prevents later confusion of words as he attaches the verbal symbol to the printed symbol. Moreover, clear enunciation prevents many later difficulties in spelling.

Attention precedes perception. The child perceives only what he "pays attention to." He is most likely to observe large things, noisy things, lights, moving objects, bright colors, or things that cause him discomfort. He observes those things in which he is interested. His needs, his motives, and the social situation will all affect his observations.

Abbreviated cues and mental constructs. As was mentioned earlier, the cues essential for recognition decrease with experience. Prompt recognition requires more experience, or more cues. The older child recognizes daddy's shape in the distance, but the younger child needs the closer approach, and the filling in of a few more details of the image, to complete the recognition.

That a stimulus may be a cue or a set of cues instead of the whole stimulus pattern is a basic principle of habit perception. The perception has stabilized with experience and occurs as the slighter cue arouses the mental construct. The rest of the figure, not revealed by sense stimuli at the particular moment, is "seen," but the "filling in" results from the interaction of the stimulus cue with the individual's memory traces.

Teaching precise observation. When the child starts kindergarten at the age of three, he may be able to enumerate things but his observation of detail is still too meager to permit him to describe things. The key to more rapid development of perception during the preschool age is richness and variety of materials for active exploration. The kindergarten experience is very valuable because it does enrich perceptual practice.

The school can help perceptual knowledge by directing the child's attention, by arousing interest in observation, by telling him what to look for, by asking questions that require better observation in order to answer, and the like. Camping and outdoor education are experiences rich in observational training. The regular grade-school work can be helped by field trips, simple science lessons, and construction projects. Discussion of his observations will help clarify his perceptions.

The child can learn to be on his guard against subjective bias in perception by having such instances pointed out to him; for example, the thin person is likely to look taller than he actually is. The short person can be made to look taller by high heels, a high hat, or dress lines. Speeds of large objects, in comparison with smaller, are underestimated. The teacher should look for likely misinterpretations in the material that the pupil is to observe, and give him examples of them. The demonstration of illusions in the particular field of observation tends to make the student more cautious and critical in his observations. The advantages of the demonstration method of teaching beginning science, as contrasted with the laboratory method, are partly due to the directed observation.

Errors in perception. There are, of course, many inaccuracies in observation. The child's desires and fears, his past experiences and expectations, have a great influence on his misinterpretation of stimuli.

Noises in the dark are attributed to bears, Indians, or burglars; a friendly dog's pursuit is interpreted as a ferocious attack; the cottage cheese is seen as ice cream until taste corrects the illusion. Early confusions occur in words of similar form. The letters "b," "d," and "p" are confused by the beginner.

Although misinterpretation is much less frequent in adults, mental sets, interests, or expectancies will alter their perceptions as well. Perceptual maturity makes the normal adult less likely to perceive objects at great varience with reality unless the cues are insufficient or the mental stress is very great. Slight auditory cues heard at night, situations of excitement such as a traffic accident or a robbery, or even the behavior of young couples as viewed by elderly critics are examples of stimulus patterns frequently misinterpreted.

Perception difficulties may be due to sense defects. The large number of pupils suffering from eye and ear defects makes an examination of every school child's eyes and ears imperative. Lack of progress is never safely diagnosed unless such examinations are made. If money is not available for examination by specialists, the school nurse or teacher may secure the eye charts and conduct the examination herself. An ordinary watch may be used to check hearing.

But there is much lack of progress without sensory defect as a cause. Errors are not uncommon due to the fact that the teacher is trying to cover too much content in the time allotted. Errors often result from too rapid observation, or from attempting to observe situations too complex for the individual's present stage of development.

Complex perceptual habits. Man has invented an immense number of memory aids and symbolic methods of communication in the form of words, music scores, formulas, telegraphy codes, semaphore signals, architectural designs, and the like. The child is confronted with the task of rendering many of these symbols so familiar as to guarantee prompt recognition. One of the child's first problems on entering school is the recognition of printed words, and the attaching of them to the appropriate oral symbols and to the objects they represent. He must reduce this perception of the printed symbols to the promptness of habit, or else the delay in recognition will interfere with his association of these individual perceptions into sentence meanings. Phrase perception instead of word perception is a somewhat larger unit in the hierarchy of perceptual habit. The larger unit of perception makes it possible to carry the span of attention over a greater area and, by checking each word interpretation with more cues from the remaining context, to improve comprehension.

The teacher should remember that rapid perception, to function efficiently, must be developed into a habit reaction. Moreover, experience with the pattern to be established must be repeated many times, in diverse total situations, so that the cues will be recognized in still other novel environments. The repetition establishes the habit reaction of perceptual interpretation in the light of associated cues, for example, other words in the sentence.

Hierarchies of organization in perceptual learning are attained only by continued purposeful practice. Passive exercise of already acquired percepts, and satisfaction with the present level of slower recognition and response, are not conducive to higher levels of perceptual organization.

The child may begin his music reading with individual note recognition; or he may begin with a five-note melody. He learns to recognize the note position and the time. When he starts on the piano, he learns at the beginning to find the keys and follow two notes with each hand while he is recognizing the notes. To become even a mediocre pianist, he must increase this perceptual span to five or six notes at a glance, in the meantime adjusting his total pattern of tempo to allegro, andante, or whatever. If one adds to this the need for tactual-auditory discrimination, ranging from fortissimo to pianissimo, one begins to realize the complexity of perceptual learning involved in the field of music.

Maintenance of high levels of perceptual skill. Even after high levels of perceptual skill are acquired, periodic practice is necessary for their maintenance. Moreover, each perceptual skill seems to be specific. Practice to maintain a high level of perceptual skill in one area does not seem to improve one in another skill nor even help maintain the achieved level of perception in that other skill.

Difficult percepts requiring long experience and maturity include the relative rate of movement of passing or approaching objects, approximations of time span, estimation of distance, size of distant objects, and form. Distance perception has been a slowly developing process that began at a low, vague level with early infant mobility. Its approximation depends upon the apparent size of objects as contrasted with their known size, the distinctness of the image, and so forth.

Insomuch as the size of the image on the retina varies with distance, size must first be observed by exploration and movement near, around, or over. Then the individual is ready to practice perception from changed positions and distances. At first the youngster sees distant objects as being small. He soon learns to see them as normal but farther away. Less vivid and etched sensing of figures and convergence of the parallel lines come to mean greater distance to him. The cue to direction of sound is the difference of loudness to the two ears; and also, at times, previous experience as to where the sound is likely to be.

Motion is perceived as change of position of the object with regard to the background against which we see it. Better judgment of speed seems to be possible when one permits the moving object to cross the visual field (with the eyes still) instead of trying to follow the object with the eyes.

Directional orientation as regards the compass points is one of the early and very important perceptions to be acquired from geography, outdoor education, or wherever it seems meaningful. Early lessons in drawing seem to help in space orientation and perception.

Perception of form is developed from visual, tactual, and kinesthetic sensations. In a person's attempt to stabilize the perception, he runs his hand over the object or sketches it in outline. He moves his eye focus around its boundaries. He sees the form bounded by different backgrounds. The shape gradually takes on a subjective definiteness, which is superimposed on later cues and thereby produces the completed habit-perception. If this form perception problem is combined with distance, size, and motion perception in an unusual atmospheric condition, the individual's subjective interpretation is likely to vary to a considerable degree from the actual objective situation. Dimness of outline has become a part of the cue for distance. Very clear air or very hazy atmospheric conditions upset this perception in reverse directions. If the reader wishes to experience this perceptual difficulty, let him stand on the wharf some foggy morning, watch the incoming and outgoing ships, and try to identify their size, lines, and specific nature; or let him try to estimate distances on his first arrival in some of our western states with their remarkably clear air.

Complex percepts in flying. Early experiences in learning to fly present examples of adult percept formation. Shape perception seems little affected by aerial distance. If the object is recognizable, it is perceived as normal in shape. Past experience keeps the "seen" shape the same as it has been known to be. Size perception of ground objects has to be re-learned before objects can be perceived as normal but distant.

Some things present quite different visual patterns when viewed from a plane. A cornfield that looks green from the ground appears from the air as a gray area dotted with green spots. New cues become necessary for recognition. One learns to utilize new cues, for example, in distinguishing between flat and rolling terrain. Curves in plow furrows or in hay windrows may be cues to uneven terrain. Roads and fences seen at an angle will show curves that indicate hilly country.

The speed of objects below on the earth is very difficult to estimate. A football game seen from the vertical position in the air appears as a slow-motion picture of a midget game. A shorter "seen" distance and the same actual time give the illusion of slow motion.

The adult understands the reason for this illusion because of his concept of size as affected by distance vision, and time as not being so affected. He has meanings that go beyond his percepts, to concepts and reason. Let us look at the difference between percepts and concepts.

Percepts as related to concepts. There is no fine line of demarcation between higher forms of perception and conceptualization. Perception is usually considered to be recognition of a stimulus or pattern of stimuli. Conceptualization is usually thought of as an aura of meaning unified by and emanating from some symbol. Its development has involved abstraction and generalization as to the significant aspects of much previous experience. However, the perception begins to take on the nature of a concept as soon as repeated experiences establish the perception as a mental construct elicited by very abbreviated cues. The "filling in" of the perception is a result of common and significant features experienced many times before. The very nature of the verbal symbol representing an object implies not only repeated experience but experience from which common traits have been abstracted.

Let us go back again and follow the infant's development of meanings to see how the individual matures, from his early organization of sensory stimuli into percepts to the later stages of symbolic thinking.

Growth of meaning concepts

Beginnings of ideational learning. The human infant, even before he begins to talk, may look for a toy with which he played at some previous time. Mothers know that infants cry for things that they cannot name. The mother brings one thing and another, only to have them refused or shoved away, until the right object is hit upon. The child feels an implicit want but has no words to express it. Higher animals and children apparently acquire memory traces without the help of language. This is the beginning of ideation. It is not meant to imply that these memory traces are, necessarily, consciously anticipated activities. That they are total pattern responses to some cue lying within the organism itself, or to a combination of cues internal and external to the organism, does not necessarily imply that they constitute awareness activity. The infant did, however, modify the mother's behavior in the foregoing illustration over a period of time. Some definite and persisting inner want functioned in changing external environment.

The behavior situation of the human organism at any time is made up of both the external and the internal environmental stimuli and responses. Just as parts of the external situation, such as the sight of the mother's face or the sound of the father's voice, become substitute stimulus cues for behavior originally initiated by the larger pattern, so internal elements of the original total situation become substitute stimuli. These substitute stimuli may include mental images. The prevalency of mental imagery in children and primitive people indicates that imagery originates early in the developmental stage.

Children's symbolism. In addition to learning to communicate with others by movements and gestures, the child soon learns the use of sounds. One child, for example, called his mother and asked for things, refused things, and expressed satisfaction or anger entirely through the pitch and intonation of one "baby word" and his postural attitude. The word he used to express all these meanings sounded like "Goo."

Oral sounds associated with situations—"da-da," "bottle," and "hot"—serve as abbreviated stimuli for responses to the total situation of which they were originally a part. These oral sounds, alone, after association with a situation is established, have meaning through the associated mental images, or through the tendencies toward action that they provoke.

However, when the child learns to repeat words by pure imitation, he may use actual words without their having any meaning to him except as they serve for verbal play. The words that the child does learn have, at first, very vague meanings. The early meaning of a word is, after all, an individual matter both in nature and degree: it connotes what it represented in the *past experiences* of the person using it.

A six-year-old boy explained "bad" as meaning not holding the pencil and paper "right" or sitting "right." He said that it was "bad to spill things" and "bad to fight," but not "bad" when he fought "just a little." When presented with an old shoe and asked if it was bad, he replied, "Pretty bad." When asked if his foot could be bad, he chuckled and replied, "Could smell bad." He was "sure" that he knew what a dog was, but could not define it. A twelve-year-old described a dog as an animal that had four legs and barked, and hunted animals, but not other dogs "except for fun." He said that it differed from other animals; also, that it differed from other dogs but in "different ways." When asked if it hunted animals "for fun," he replied that it might play with them before it killed them. When asked if it would eat other dogs, he said, "Not unless it is necessary." He offered "evil" and "criminal" for synonyms for the word "bad."

The egocentric nature of the child's thinking can be noted in the word interpretations of the above-mentioned six-year-old boy. Personal experiencing of social disapproval has conditioned most of his responses to the symbolic cue "bad." This six-year-old boy has progressed beyond mere use of nouns. He is able to use verbs as symbols to express action but, even more, he is beginning to analyze qualities or characteristics of things. He is now using adjectives and, to some extent, adverbs. The characterization of the old shoe as being "pretty bad" and the foot as "smelling bad" illustrate an extension of the meaning into new dimensions beyond the basic meaning.

The twelve-year-old boy shows the advantage to word interpretation of experiencing the symbol "dog" in a great variety of situations. His interpretation of bad as meaning "evil" or "criminal" reveals the more mature development of the concept in its basic meaning.

Differentiation into percepts and concepts. First impressions of an object seem to be of its general form, outline, or framework. The earlier perceptions are of gross similarities, which seem to transfer response patterns. Examples are numerous. Automobiles are just "cars" to many people, indistinguishable as to make, model, or type. To most people, a sheep is just a type of animal. More experience begins to reveal individuality in the specific individuals of the type; and begins to synthesize recurring general traits and aspects. A pet lamb or the old ram who dominates the flock begins to be known as an individual. The sheep as a type begins to be known for its wool production and for its edible flesh. The dog, another animal, is a different type of animal. With successive experiencing, responses suitable for the common elements gain in development. Responses suitable only for individual examples become tied into the recognition construct of a specific perception but dissociated from the class or type symbol. "Rover" is a recognized acquaintance but the various stray canines that roam the neighborhood are "dogs." These latter have certain common characteristics and aspects. Attaching word-symbols to successively appearing characteristics and aspects, or to any objects that have these common traits, epitomizes the experiences and integrates them into a unit of meaning. They become dogs or sheep or cows or horses, depending on certain general traits.

We have moved from gross outline recognition through familiarity with specific perceptions; and then to a synthesis of experiences around a verbal symbol according to aspects or traits. The common aspect may be such a quality as number, color, or roundness. A word-symbol for the aspect is furnished to the learner by other persons, and is encountered in the varying situations. The symbol becomes attached to the responses to the quality of an object rather than to the object itself. "Red" appears as a part of the situation in houses, flowers, dresses, vehicles, lights, and rouge. Gradually the light stimulus of a certain narrow range in wave length becomes associated with the verbal symbol "red."

Basic meaning. Children's symbols are usually at a lower level of meaningful development than the symbols of adults. The adult, by using a symbol a great number of times, abstracts the common qualities and synthesizes them into the basic meaning. This basic meaning is likely to be the one aroused, unless the individual is attempting to pun or form bizarre associations. Children tend to be more vague and hazy in regard to word meanings. They are likely to use symbols in a way which seems naive and foolish to the sophisticated adult. However, given time, the varied experience, error-checking with purposeful observation, and adult guidance, the children will develop basic meanings.

Verbalism without basic meaning. Experience may condition the child to substitute verbal symbols as responses to other verbal-symbol stimuli because of the greater social approval. Such association is no guarantee that the symbol has attached to it the variety of responses necessary to make it functional in specific contextual or environmental patterns. Meaning is specifically related to the child's own experiences. Vicarious experiencing, as an educative practice, implies sufficient awareness of identity between the individual's own personal experience and the "secondhand" experience to make the transferred experience meaningful.

As we try to force a great many concepts on our students in a relatively short time in our schools, we produce rote learning of nonmeaningful responses. A concept takes time to develop. The substitution of rote verbalism for understanding is an educational malpractice by no means limited to the elementary schools. Too often in the higher academic levels, vagueness of thinking and superficial knowledge are successfully disguised by euphonious polysyllables.

Arbitrary, associative learning. Whenever practicable, learning should be based on meaning and full understanding; however, the student can be saved much time and trouble by the repetitive practice and rote learning of some materials. Spelling is not a procedure based on meaning; neither are many of our grammatical rules. Dates, days of the month and months of the year, number combinations for the skills of arithmetic, and the like are largely matters for rote memorization.

Drill, external motivation, rhythms, and any chance similarities or possibilities of organization may be used to establish associative learnings. Associations that must be correct and immediately available when needed are often best established by such methods. Arithmetical drill is an economical way to learn number combinations. One might very well determine the correct answer to problems involving number combinations by a series of additions and finger countings, but the procedure is too slow and not as apt to be as accurate as the habit response established through drills. "Eight times seven" and "nine times six" do not seem to be types of learning that can be economically established by meaningful incidental use. Memory devices, such as the old rhyme "Thirty days hath September . . . ," or the use of the word "lice" to provide the key for the respective vowels after "l" and "c" in "believe" and "receive," are well-known devices. Who could confuse "stalagmites" and "stalactites" again after hearing the statement, "The mites go up and the tights come down"?

Motivated drill necessary. When arbitrary associations are to be established, extrinsic motivation, repetitive practice, and prompt correction of error are the keys to method. Results are measured in terms of speed and accuracy of response. The individual when learning material of this kind will organize it in some manner of his own as he tries to learn it. The method may be rhythm, superimposed meanings, or what not. He is usually the best judge as to his own method. Practice must be continued far into the overlearning stage.

It is difficult to conceive of a rapid method of learning a foreign language for speaking and writing purposes that does not involve much memory work and drill. A person can learn the language by living among those who already speak it. Even so, he learns more rapidly if he drills and practices. Most students are not fortunate enough to be able to learn their foreign languages in countries where those languages are spoken. Yet the *good* school program in foreign language, much of which has necessarily been composed of rote or associative learning, has done a great deal to establish basic groundwork in those languages.

No successful methods have yet been discovered by which the teacher can make everything that must be taught meaningful to the child at each particular grade level. To date it has seemed better to drill the child in certain portions of the social heritage that will be required later on. School subject matter, even when not completely understood by the student, should leave him a residue of learning that saves him much time in reacquiring the bulk of the material later, when it is needed.[8] Meanings are, by their very nature, vague at first, depend on accumulating experiences for their development, and take time, as well as experience and use, for their growth.

Rote vs. logical memory. When practicable, the memorization of necessary facts should follow the learning of the significance of these facts. This statement is applicable to arithmetic, social studies, or almost any other school subject. For practical purposes, it will be necessary to memorize some material that can be used even before one's understanding of the entire material is complete. In science, mechanics, and mathematics, for example, it is frequently economical (in terms of learning time) to accept expert opinion for the correctness of a formula or a method, memorize the formula or method, and proceed to use it.

The foregoing statements should not be interpreted too broadly. It has been found that arithmetic, for example, is learned more easily and rapidly if counting and number work are postponed until certain basic quantitative concepts are developed.[9] A certain level of educational maturity of the student (a mental age of six years and six months is often used instead) has been found to be necessary before the student can be taught reading economically. A mental age of about ten years seems to be requisite to learning geographical names and places with an understanding of space and orientation. The abstract concepts of elementary social science are apparently better learned after the mental age of twelve.[10] In other words, a basic amount of educational maturity is essential in many subjects before even fact memorization is accompanied by meaning in use. When applicable to the material, logical memory requires less expenditure of time than rote memory; also, it is less subject to loss through forgetting.

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[8] Cf. H. E. Burtt's studies of the retention of meaningless Greek in "An Experimental Study of Early Childhood Memory," *Journal of Genetic Psychology*, XL (1932), 287-295.

[9] W. A. Brownell and G. Hendrickson, "How Children Learn Information, Concepts, and Generalizations," *Learning and Instruction*, Forty-ninth Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press, 1950), chap. 5, pp. 92-128.

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The importance of language in concept development. The child's early language is made up largely of nouns. As soon as a noun begins to refer to more than one item of a kind, it is taking on the general framework of the *concept.* Abstract nouns and descriptive adjectives tend to develop a little later. Meaningful use of either implies a concept of *aspects.* The aspect of quantity *(more* or *less)* begins to develop in the preschool period.

The importance of language in human understanding is almost impossible to exaggerate. The symbol, the core, the matrix that unifies and preserves abstracted, integrated, and synthesized experience is usually a *word.* It functions without recall of the pertinent experiences. It is the "shorthand" that allows experiences to be fed into the infinitely complex "electronic computer" of the human mind.

Concepts organize and refine experience. Successful advancement in the fields of human learning would be impossible without concepts as tools of thought. Only by their means can experience be labeled, identified, classified, and organized. Understanding depends on this association. Unorganized masses of factual material can neither be comprehended nor retained. They must be classified under their appropriate concepts, and mentally filed for use.

Science is continually trying to refine its concepts. The analytical process of science—the attention to aspects, relations, characteristics, traits, or parts instead of the whole—is a relatively mature mental process. The ancient shepherd had no counting system; so he learned to recognize and remember each individual sheep (by name). Such a laborious procedure of distinction between, and memorization of, percepts has value in certain areas. Political popularity seems to depend partially on remembering individual people. But this process, valuable as it may be at times, is the perfecting of a lower level of mental activity. Much of our knowledge must be retained for use without the presence of memory of the hundreds of original percepts from which we abstracted the knowledge.

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[10] T. J. Eskridge, "Growth in Understanding of Geographical Terms in Grades IV to VII" (Duke University Studies in Education [Durham, N. C.: Duke University Press, 1939]).

The concepts of science are usually based on the cause or origin of phenomena. When phenomena are inexplicable without a concept, one is formulated. Examples of such formulations are the concepts of gravity, electricity, energy, and relativity. The organization of experience into meaningful material depends upon concept formation; completeness of understanding depends on experience adequate to permit precision and exactness.

Suggestions for teaching concepts. In order to foster growth of word-symbol meanings, the teacher should keep in mind that concepts (1) develop through numerous specific experiences from everyday life; (2) grow slowly from the concrete, perceptual level to the abstract, relationship-of-common-elements level; (3) must await educational readiness for learning on a higher, abstract level.

The child should be given adequate opportunity to use his concepts, to express them to the class, to adjust them in the light of errors, and to elaborate on them. Group discussion guided by the teacher, together with study based on key questions, may serve to clarify the child's meanings. In a physics class, for example, one teacher asked his class what effect a reduction of the earth's gravity to that of the moon would have on high jumpers. A social studies teacher asked his class what the effect would be on the school if the students were permitted to govern it by democratic procedures.

Use of a suitable vocabulary is a difficult problem for the teacher. New concepts should be introduced in language that the child, himself, can use functionally. Even so, simple language will not clarify a difficult idea—"The whole is more than the sum of its parts," for example, or "All things are made up of energy."

The teacher can accelerate the formation of concepts by: (1) introducing the concept with examples in which the basic relationships *stand out;* (2) keeping the early examples as close as possible to the concrete objects and perceptual level of the everyday life of the child; (3) reducing the number of concepts to be covered, and allowing more time and a greater wealth of experience for each; (4) giving regular practice in use, with guidance, motivation, and opportunities for success; (5) directing the child's attention to the *general traits or aspects* by copious illustrations, examples, pictures, and the like; (6) helping the child to formulate in verbal symbols an expression of these general traits, or aspects, for the purpose of analysis; and (7) helping him to discover what symbolic cues *in his own repertoire* will fuse into the concept if brought together under the focus of his attention.

The teacher should be careful not to abbreviate experience to verbal symbolism too rapidly. Even a parrot can recite learned answers to questions. A person who really understands has had sufficient meaningful experience to fit his own symbols precisely to the situation. A background of much information fosters precision of response. The teacher-formulated answer, memorized but inadequately understood, is not independently applied to new, pertinent situations.

Summary

Sensorimotor behavior begins with the gross muscular reactions of the fetal response to a stimulus. The development of the nervous system makes possible movement responses to distant stimuli. Motor control of the body develops from the head end of the child, downward and outward. Infant development includes sitting alone, crawling, prehension, and walking. Life demands much motor-skill development. A challenging environment stimulates the child to develop his powers more fully. He needs equipment, space, opportunities, and help. Playgrounds and playrooms, nursery schools and kindergartens, are sources for such experiences.

Skills are built on preceding learning and tend to develop in hierarchies. Improvement in skill depends on intent, adequate, purposeful practice and suitable form. Skills are specific to the activity but, when well learned, adjustable to changes in environmental conditions. Skills are not exact repetitions of the same movement patterns. Fluctuations in performance occur at all levels. Form is, to a considerable degree, an individual matter, although much time may be saved by imitating a form that has proved successful for many others in the past. The teacher can short-cut the learning procedure by guiding the learner into such procedures, especially in regard to sound mechanics of preparatory position and of basic motions.

The development of perceptual behavior refers to the growth in ability to recognize previously experienced stimulus situations in an increasingly adequate or socially more acceptable form. The infant's early recognitions are of hunger stimuli, parents, feeding equipment, toys, and the like. Words become attached to experiences and recognized first by sound and, after schooling, by sight. Perception develops in hierarchic units; for example, word recognition progresses to phrase recognition. A memory "type" fills in the perception even when there are few cues. Memory "types" correct variations in sensory presentations. Cues from various sensory modalities fuse into complex perception; for example, notes, time cues, and intensity cues fuse into each single perception by the pianist. These complex perceptions are prompt, habitual recognitions, and must be so to have the speed and accuracy essential for functional use.

Conceptual behavior implies that the individual is guided in his responses by symbolic cues representative of the significant features in much previous experience. Whereas the mental construct fills in the sensory perception of the specific case, the concept fuses object similarities or aspects into a core of meaning. A symbol, usually verbal, is the expression of, and the integrating factor in, this aura of meaning. The symbols may refer to classes or to aspects. Verbal symbols need a background of direct experience to gain clearness of meaning. Concepts develop by the application of experience to seemingly similar situations and by the readjustment of responses in the new situations. Social guidance accelerates the process by calling attention to common characteristics and furnishing symbols for these characteristics. The concept multiplies the mass of experience reducible to units of meaning. The labeling, classifying, and organizing of experience into concept units increases tremendously the possibility of one's grasp of meanings.

In teaching concepts, the appropriate symbols should be associated with the student's firsthand experiencing. The student's observation and analysis can be so directed as to focus on general characteristics. Concepts introduced to the immature student, through the medium of verbal symbolism only, lack precise meaning. The student learns a vagueness of thinking, a substitution of rote statements for meaningful responses. He covers the blemishes in his thinking with verbal cosmetics unwittingly furnished by the teacher.

QUESTIONS AND EXERCISES

for discussion and study

1 In ten practice periods at spaced intervals, attempt to learn any one of the following skills which is new to you: ice skating or roller skating,

spinning and balancing a basketball on one finger, writing with the pencil gripped between your large toe and its adjacent toe, juggling two or three balls.

2 Check among your family and friends as to their means of remembering: to mail a letter, keep an appointment, an address or telephone number, articles to be bought on a shopping tour, points to be made in a speech or formal argument, location of personal items when they need them. Then compare these findings with your own processes in attempting to recall.

3 Suggest techniques for learning the following:

a. Major points of this chapter,
b. Birthdays of family and friends,
c. Important dates in history,
d. Quotations to be learned in your literature courses,
e. A vocabulary list in a foreign language,
f. Scientific formulas,
g. How to extract square root.

4 To study the fusion of sensations from various sense organs and past experiences into new perceptions, select any one of the following foods with which you are either vaguely or not at all familiar, and repeat the experience of eating it until the perception is well developed: persimmon, pomegranate, guava, mulberry, serviceberry, shrimp, snails, sweetbread, clams, eels, lobster, Limburger cheese. Analyze the development of the perception.

5 Determine by experiment how early a child of average intelligence learns to select the larger of two pieces of a desirable edible. Observe the growth of the habit of courting social approval by selecting the smaller piece, in youngsters of kindergarten and primary-school age.

6 Think over your elementary-school experiences in learning the skills of handwriting, reading, arithmetic, spelling. Did the practice procedures differ in: length, interest, amount of physical rehearsal, mental practice between drill assignments, imitation of others, learning procedures thought through and planned beforehand?

7 How is the development of skills affected by: A dynamic want to master the skill? Correct practice? Knowledge that progress is being made? A feeling that the skill is not worth learning? Failure to master the skill? Vigorous health?

8 At what stages of learning can one profit most by longer drill periods, beginning or advanced? At what stage of learning is detailed self-analysis most profitable?

9 How would you teach a youngster to ride a bicycle? To throw a ball for distance? To produce the appearance of three dimensions on a flat-surface drawing? To orient himself and be able to point out North, South, East, and West?

10 A six-year-old with a mental age of nine asks you why the artificial satellite does not fall. Work out your vocabulary, sentences, and illustrations to answer his question so that he will understand.

11 What are the differences in types of learning necessary to answer the following types of questions over the same lesson content:

a. A true-false question,
b. A multiple-choice question,
c. A completion question,
d. An essay question as to cause and effect?

12 A group of city children were making an excursion to the country. One asked the teacher, as the bus pulled out of the city into farm areas, "Is there much country around here?" What would you reply to the child to clarify his thinking with regard to the respective extents of urban and rural areas?

13 Should you expect the same results from reading a true-false test aloud to students as from presenting it to them in mimeographed form? Why (or, why not)? What is the value of giving students a test covering a unit of subject matter before beginning the teaching of the unit?

14 Which promotes greater achievement by a student: (a) having the teacher supply the information to students, or (b) letting them discover the facts for themselves? Does the student learn faster by rereading, or by trying to recite after his first reading? Should the teacher supply the wording for the student's conclusions, so as to increase the precision and exactness of the student's concept or generalization?

15 How has your study of science affected your concepts of: distance, time, the nature of matter, energy?

16 What are the implications as to meaning in the following statements:

a. "Only those who have lost it for a time, can really understand democracy."
b. "The greatest danger to the world is mass ignorance."
c. "Knowledge is virtue."
d. "Cognition is not volition."

What change is implied in (a) the concept of democracy? The last three all deal with aspects of knowledge. Explain the concept implied in each.

17 How can students develop a mastery of educational psychology more economically? Would you advise considerable library reading on the subject, discussing it with others, outlining lessons, writing papers for publication, explaining it to others, making experiments, or studying psychology and doing supervised student teaching at the same time? Why (or, why not)?

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CHAPTER 19

Creative thinking, reasoning, and problem-solving

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What is creative thinking, reasoning, and problem-solving?

LIFE IS LARGELY A PROCESS of satisfying wants—wants for food, clothing, shelter, information, school grades, new experiences, excitement, approval of others, and so on. Some wants are easily satisfied, such as wants for air, water, or space in which to move; others are relatively difficult to satisfy, such as wants for success, for wealth, for the approval of others; and some cannot be satisfied at all, such as wants for unlimited longevity, omnipotence, or an unrestricted sensory range. Wants that are easily satisfied are usually taken as a matter of course and are seldom given more than passing attention. Wants that cannot be satisfied at all are, in general, recognized as such and ignored. The wants that most people spend their lives in striving to satisfy are those that are neither easy nor impossible. For example, the want for a college education is difficult, but not impossible, to satisfy. The want to enjoy good health is not easy to satisfy; it requires attention and effort. The want to be successful in business can be satisfied—but only by individuals who are willing to work diligently.

Wants are sometimes called "motives" and range from those of a strictly personal nature—such as the want for a drink of water, or to lie down and rest, or to listen to symphony music—to wants that are part of a complex social situation—such as the want to promote the election of a friend for governor, or to integrate children of all races in the same school classroom, or to manufacture superior razor blades with greater efficiency. Wants may also range from those that are approved by society—such as the want to build a new hospital for crippled children, or to pass a law prohibiting the dissemination of enemy propaganda, or to clear the rubbish from vacant lots within the city limits—to those that are contrary to society's code of ethics and public law—such as the want to possess property without paying for it, or to exceed the speed limit on residential streets, or to sell opium to addicts. In other words, some wants are socially inappropriate, and either should not exist at all, or should be appropriately modified.

The satisfaction of wants or motives is sometimes called the "goal" and is peculiar to the individual who has the want. The food that will satisfy the hunger want in one person may not satisfy the same want in another. The goal of the hunger want of Mr. A. may be raw seal meat without salt, whereas Mr. B's hunger want may be satisfied only with beef filet broiled and smothered in mushrooms. Want satisfactions are personal and may or may not conform with the standards of other people. Only the individual himself can determine when his want-goal has been reached.

The satisfaction of wants may be hindered or interfered with by difficulties of at least three different types—personal inability, physical limitation, and social taboo. For example, the want for food may not be satisfied because the individual has no teeth, or because the food is miles away, or because society has decreed that food must not be eaten in that location. The difficulty may be easily and routinely eliminated, or it may be of such magnitude that the want can never be satisfied.

The interrelationship of these three factors—the want or motive, the satisfaction or goal, and the hindrance or difficulty—constitutes the pattern of organic adjustment to environment. Both lower animals and human animals live or die depending on their effectiveness in environmental adjustment. If wants are strong, perhaps even necessary for life, and if hindrances are great, then states of tension are created that act as internal drives to activity. When the equilibrium has been disturbed a problem exists, and this provides a need for thinking and reasoning.

This chapter concerns ways of solving such problems. Figure 19-1 shows the elements of a problem situation in graphic relationship.

Terminology. The words in the title of this chapter are often used without exact meaning and sometimes even with mystical connotation. For example, "thinking" is often loosely defined as "the action of the mind," or "reasoning," or "being logical." Such definitions are no better understood than the words they define. The scientifically trained psychologist must either define his terms with exactness of meaning or not use them at all.

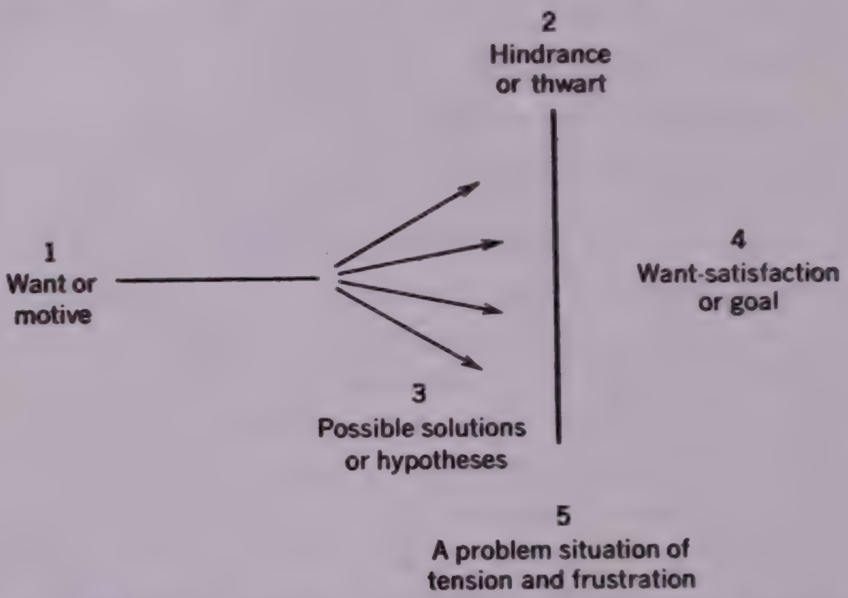
2
Hindrance or thwart
1
Want or motive
4
Want-satisfaction or goal
3
Possible solutions or hypotheses
5
A problem situation of tension and frustration

Fig. 19-1. A want or motive (1) is directed toward a state of want satisfaction or goal (4), but is hindered by some difficulty (2), necessitating some sort of problem-solving behavior. If this behavior is not promptly successful (and if the want is strong enough) a state of tension and frustration is created (5) which constitutes the occasion for "creative thinking, reasoning, or problem-solving."

Thinking is language or symbolic behavior, although all symbolic behavior is not thinking. Language is used in two ways—to communicate with other people, and to talk to ourselves about places, people, things, and events that may be absent in either time or space or both. Language is a type of vicarious behavior in which we react to places, people, things, and events either present or not present. We call this type of behavior "thinking." It may range from the simple description of past events and remote places, people, and things, to the fantastic description of events that never occurred and places, people, and things that never existed. The former is called *recall thinking* and the latter is called *imaginative thinking.* Language may be verbal, written, pantomime, or some other form of symbolic behavior, which means that thinking may be verbal language, written language, or pantomime language.

Perhaps the greatest value of language is that it permits a comparison of the present with the past and the absent. An event, person, place, or thing now present can be compared with events that occurred yesterday and places, persons, and things that are located elsewhere. The present can be observed and compared with the language descriptions of observations made at former times and at other places. Consequently, the sequence of events in time, involving places, persons, and things present or absent, can be observed and described. Events may be observed to follow in sequence when certain things are present, and not to follow in sequence when those things are not present. In other words, the language description of past events and absent conditions has enabled man to observe *cause-and-effect relationships.* He can now observe causes and *predict* effects, and he can observe effects and *infer* causes. Prediction and inference are the highest forms of language behavior.

Creative thinking means that the predictions and/or inferences for the individual are new, original, ingenious, unusual. The creative thinker is one who explores new areas and makes new observations, new predictions, new inferences.

Reasoning is the word used to describe the mental recognition of cause-and-effect relationships. It may be the prediction of an event from an observed cause, or the inference of a cause from an observed event. Accuracy is the criterion of good reasoning.

Problem-solving is the framework or pattern within which creative thinking and reasoning take place. The state of tension created by unsatisfied wants drives the individual to exercise his greatest effort and to use his best language techniques—observation, prediction, and inference —to control the difficulties that hinder progress toward his goal of want satisfaction. (See Fig. 19-1.) Successful problem-solving and successful living are identical. Culture itself is but a record of how our ancestors have solved various problems.

Intelligence, as we shall see in a later chapter, is the capacity to use language in the solution of problems. It is the ability to think and reason on given levels of complexity. This ability ranges from idiot, imbecile, and moron levels, where only simple problems can be solved, to genius levels where problems of much greater complexity can be handled successfully. Although intelligence cannot be learned, techniques of problem-solving can be so improved that it appears that intelligence increases. People who have learned effective problem-solving techniques are able to solve problems at higher levels of complexity than more intelligent people who have not had such training. The latter part of this chapter will be concerned with procedures of learning how to solve problems.

Levels of problem-solving. There are levels of problem-solving, ranging from those that involve only simple wants with the conditions for satisfaction present and available without much effort, to those of high-level complexity requiring the solution of prerequisite problems intermediate to the satisfaction of the primary want. For example, a simple problem is to satisfy the desire for a drink of water, which can be obtained at a nearby drinking fountain. A more complex problem may involve the want to install a water system in the middle of a desert where an ore deposit may have been discovered. The satisfaction of this want will necessitate the solution of many prerequisite want problems—where to get the water, how to get it to the desert location, how to keep its cost within budget limits, how to store it for varied consumption rates, and so on. These prerequisite want problems must be solved before the major want can be satisfied. There are other intermediate levels of problem difficulty between these two extremes.

Unlearned or "instinctive" problem-solving behavior. Some lower animals appear to satisfy their wants in blind, mechanical ways that are determined, not by the peculiar conditions of the environment at the moment, but by the inherited organic structure of the organism itself. The animal is so constructed that it reacts to its wants in certain fixed ways, whether or not those ways are appropriate for the immediate occasion. These fixed ways of behavior are apparently unlearned, and vary little from individual to individual in the same species. For example, the food wants of certain bees are satisfied by their tropistic and immutable positive reaction to the odor of flowers. Their wants to escape danger are also satisfied by a fixed pattern of behavior—stinging the adversary—which often results in the death of the bees, as well. On the other hand, the wants of a bat to escape danger are usually satisfied by a negative reaction, withdrawal from sunlight, whether or not the danger is associated with the light. Such instinctive reactions to difficulties are successful as long as those difficulties are usual and ordinary; but when the difficulties are unique, fixed patterns of reaction often prove inappropriate.

Unlearned behavior has general survival value; that is, it can solve a majority of problems of most members of a species. The welfare of the relatively few members who are not benefited by unlearned behavior is unimportant in the long run. Unlearned behavior is a phylogenetic way of solving problems that benefits the species but not always the individual.

Closely analogous to unlearned behavior is habitual behavior, which is ontogenetic in origin but often as inappropriate for the problem at hand as unlearned behavior. In man, habits are usually mutable enough to be adjusted to the peculiarities of each new problem. Animal habits are more fixed and less capable of alteration. In this respect they resemble unlearned behavior. In fact, habits that are learned early in life are often confused with those that are unlearned. They differ in origin but not in usefulness in solving problems that vary from those for which they were originally intended. However, like unlearned patterns, habits have value in the long run and are more often appropriate than inappropriate. Take, for example, the chicken hen's learned habit of running for cover when she sees a shadow pass along the ground. (Incubator and brooder-raised chickens do not have this habit.) Occasionally such a shadow does indicate that a hawk is overhead. The habit has an over-all value but often does not fit the specific problem situation.

Thus, whether fixed and immutable patterns of problem-solving are inherited or habitual, they are equally inappropriate for problems that vary fundamentally from those for which the patterns originally developed. Consequently, they have only long-run value in species survival.

Trial-and-error problem-solving behavior. One of the earliest experimental studies of problem-solving was made by Thorndike.[1] He placed a hungry cat in a closed cage, and a plate of food just outside. The cat could escape from the cage through a door by pulling a string extending from the latch to a position inside the cage. The motive or drive was hunger; the goal was the plate of food outside the door. The solution was to pull (by clawing or scratching) the string, and thereby release the door.

When the cat was placed in the cage, it tried all sorts of ways to get to the food, over and over again. It tried to squeeze through the bars of the cage; to claw the bars away; to reach to food by extending its paw between the bars; to claw through the floor, and so forth. However, it finally (and apparently by accident) pulled the string and released the door. The problem was solved. The food was reached, and the want was satisfied.

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[1] See E. L. Thorndike, *Animal Intelligence* (New York: The Macmillan Company, 1911).

The questions then remained: Did the cat know how it had solved the problem, and could it solve the problem again? The next time the cat was placed in the cage, it did essentially the same things, except that it did not repeat them quite so often. The apparently accidental solution came sooner than in the first trial. This was also true with subsequent trials. Errors were made but not so often, and the string was pulled after less and less time as the cat apparently learned the solution. Finally, the cat pulled the string almost immediately after it was confined in the cage. A typical curve for one of Thorndike's cats is produced in Fig. 19-2.

This was the first experiment with what is now called an "operant box." The trial-and-error learning is now called "operant conditioning." Thorndike found that the *right* response became bonded to the food by what he called an $S \rightarrow R$ bond. This was his "Law of Effect," which is now known as *reinforcement.*

Whether or not cats are capable of a higher form of problem-solving

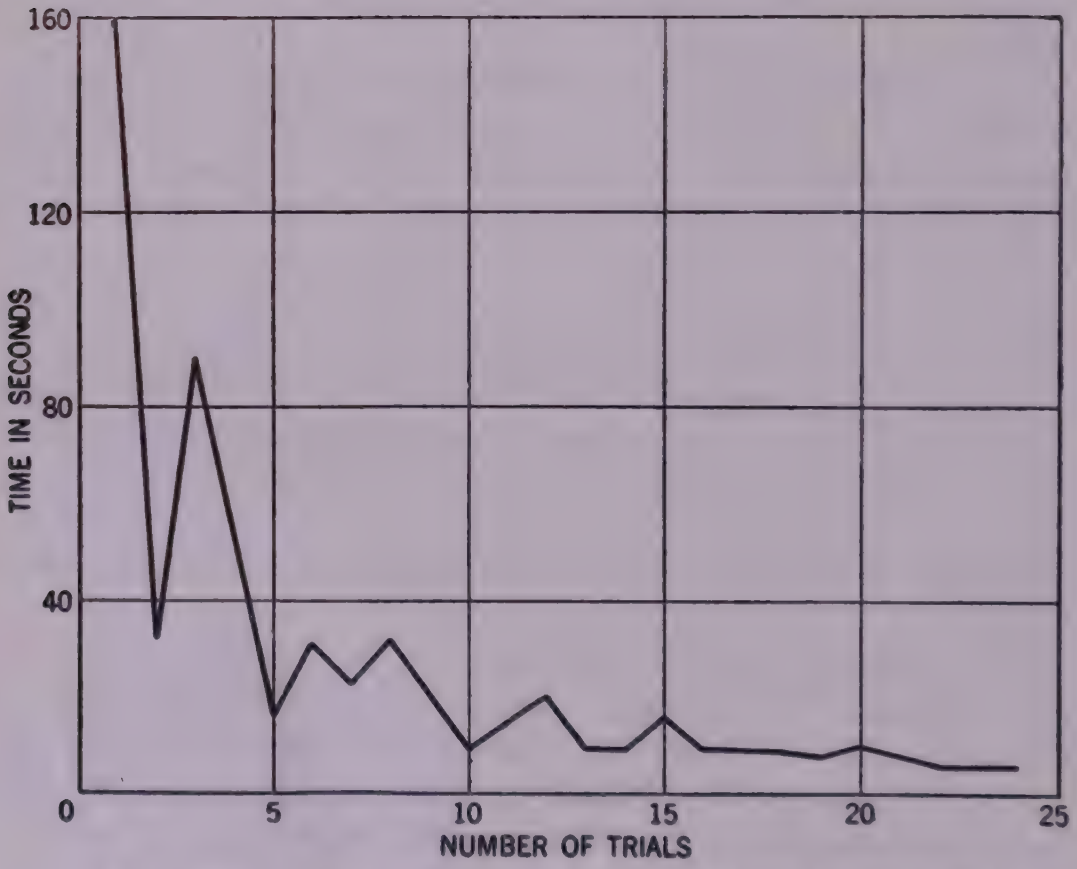

Fig. 19-2. Learning curve of a cat. (From Thorndike.)

behavior when the problems are more appropriate need not concern us here. The point is that lower animals (and higher ones, too) use trial-and-error behavior in certain problem situations. Furthermore, learning the solution in such situations is gradual and shows no indication of insight or understanding.

After Thorndike's experiments, much discussion arose as to whether or not the lower animals could solve problems on a higher level than that of trial and error. Some said that Thorndike's problem was too difficult. Because the string which extended from the door latch to a position inside the cage passed outside the cage, it was impossible for the cat to see any relation between the string and the door. It was alleged that even a human could not solve the problem in any manner other than trial and error because the relationship between the string and the door was hidden.[2] Consequently, experiments were devised in which the problems were not too difficult for the animal subjects.

Insight problem-solving behavior. Wolfgang Köhler performed problem-solving experiments with chimpanzees, at a German anthropoid experimental station on an island off the west coast of Africa, which have become almost classic.[3] Using hunger as a motive and food as a goal, he devised simple problems that could be "figured out" by the animal. One experiment involved suspending food from the roof of a cage beyond reach of the animal and then placing a stick in the cage that could be used as a tool to reach the food. Other experiments followed the same pattern but changed the tool. In one variation, a disjointed bamboo pole that could be assembled and used to reach the food was placed in the cage. In another, three boxes were put in the cage; if the animal piled these on top of each other and stood on the pile, he could reach the food. Still a third variation consisted of tying a string from the food to the side of the cage.

Although all these problems were apparently simple, some of the chimpanzees could not solve them even when the solution was demonstrated. In most cases, the attempts at solution were not blind, however, but showed some degree of insight. In one case, a chimpanzee tried placing a box against the side of the cage and then climbing on it before it fell to the floor. Although this was an error, it showed a partial understanding of the use of the box. In another case, when the food was placed outside the cage, just beyond reach, a chimpanzee tried to use a string as he had learned to use a stick. It was an error, but not a very great error for a chimpanzee.

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[2] In fact, one investigator found that infants from 28 to 52 weeks of age could solve problems in a trial-and-error manner, with the solution coming by accident. See E. Matheson, "A Study of Problem Solving in Pre-school Children," *Child Development*, II (1931), 242-262.

[3] These are reported in W. Köhler, *The Mentality of Apes* (New York: Harcourt, Brace & Company, 1927).

These experiments seem to indicate that whether an animal solves a problem by trial and error or by insight depends on whether he is intelligent enough, or whether the solution is simple enough for him, to perceive the means in relation to the goal. When the relationship is not perceived, he uses "blind" effort. Of course, it is difficult to decide whether or not an animal understands a relationship, since he can neither describe the relationship nor answer questions about it. Köhler concluded that when the solution came to the animal suddenly, instead of gradually as in the case of Thorndike's cats, the animal was acting by insight. At any rate, his learning curves did not show gradual decreases in solution time, as in Fig. 19-2, but rather the sudden elimination of errors. Once an animal had solved a problem by insight, he knew the solution from then on.

Vicarious problem-solving behavior. As far as is known, no infrahuman animal can respond to absent situations as though they are present. Apparently, only man can re-create the past, extend his sensory range far beyond nature's limitations, and accurately predict consenquences that have yet to occur. No lower animal is able to live in a vicarious world composed of elements that are actually remote in both time and space. Man's superiority in this respect is due to his ability to use what de Laguna has called "predicated language."[4] Some of the lower animals can make interjectional announcements, but, as far as we know, only man can use whole sentences.

The value of sentence language in solving problems is basic to all of civilization. This one ability has enabled man to *pre-solve* his problems and *foresee* the consequences. By language description and prediction, man can cross his bridges before he comes to them and reduce his errors a hundredfold. He can record his experiences and pass them to the next generation as a social heritage. Sentence language is sometimes implicit or "spoken within oneself." As such it is often called *thinking* and alleged to transcend the language level. Language is no less language when it is whispered or implicitly spoken to oneself than when it is spoken aloud. Thinking is the use of sentence language, whether overt or implicit, spoken, written, or in pantomime. The identification of "thought process," or implicit language behavior, with neuro-muscular function is well substantiated by the experimental studies of Jacobson, Max, and others.[5]

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[4] G. de Laguna, *Speech, Its Function and Development* (New Haven: Yale University Press, 1942).

The scientific paradigm of problem-solving. Perhaps man's greatest use of sentence language has been the system that he has developed for its application to problem-solving. It is not language alone that enables man to control the problems of his environment, but also the way in which he uses language. Two men of equal ability with language may not be equal in their ability to solve problems. One may have a better method of using his language, and thus far excel the other. One of the most significant respects in which civilizations and cultures differ is in their methods of solving the problems of environmental adjustment. Distinctively characteristic of the modern world is its method of solving problems through employment of the scientific method.

Although the following paradigm is often called the "scientific method," largely because it was first used by scientists, it is as applicable to the study of personal problems as to scientific ones. It is the procedure used by intelligent individuals when they solve difficult and complex problems. It was referred to in 1911 in a book by John Dewey, *How We Think*, as "the complete act of thought." The paradigm, however, is as old as science itself. Probably the pyramids were the result of these procedure steps.

1. *Understanding the problem.* This means that the first step is to find out exactly what the want to be satisfied is, what the difficulties are or are likely to be, and what will constitute a solution. The trained scientist performs this step very carefully and exactly. He finds out what is to be done before he begins and this eliminates much useless effort.

2. *Collecting information or data.* A lower animal or an ignorant person collects little or no information about a problem before rushing ahead to try out some solution. An intelligent person finds out what others have done with the same or similar problems. Perhaps the problem has already been solved by someone. Perhaps someone has discovered key information that would take weeks to rediscover. Perhaps others

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[5] L. E. Jacobson, "The Electrophysiology of Mental Activities," *American Journal of Psychology*, XLIV (1932), 677-694; and L. W. Max, "An Experimental Study of the Motor Theory of Consciousness," *Journal of Comparative Psychology*, XXIV (1937), 301-344.

have made errors that can be avoided by knowing about them. Intelligent problem-solving, whether of scientific problems or personal adjustment problems, is always based on whatever progress has already been made. This is the "cultural heritage" that should mark the beginning of problem-solving effort.

3. *Formulating possible solutions or hypotheses.* As information is obtained about a problem, ideas or "hunches" are suggested about how to solve it. These may be formulated into hypotheses. One of them may turn out to be the correct solution. It may even be a "great idea," the birth of an invention, a rare "spark of genius." The worth of these possible solutions depends largely on the originality and intelligence of the problem-solver. It depends on whether or not he can visualize the relationship between the facts he has just learned and the problem to be solved. Problems are solved by putting old ideas and principles in new relationships and using them in new ways. This step is where creative thinking is usually active.

4. *Evaluating the possible solutions.* This step is really a continuation of the preceding one. In a way, it is interlocked with it. As possible solutions are formulated they are also evaluated. It is a step of judging and predicting. It is forecasting the consequences if a solution is tried. Success in this step depends in part on the degree of intelligence possessed by the problem-solver and in part on the painstaking detail in imagining exactly how the possible solution would work, considering all the facts learned in Step 2. The detailed nature of this evaluative step will depend on the nature of the problem. Various devices to assist imagination have been used, such as blueprints, mock-ups, models, and so forth. Often such devices will identify needed information that may or may not have been obtained in Step 2. Whatever procedure is used, exactness in imagination will be correlated with accuracy in prediction.

Often all of the suggestions for solution are judged to be worthless and are dropped. It is then necessary to go back and reanalyze the data or perhaps search for more data. The right solution is always buried in the information. Returning over and over again to the information step (Step 2) may be a sort of trial-and-error procedure. This depends on the difficulty of the problem, the amount of information, and the intelligence of the problem-solver.

5. *Trying or testing possible solutions of predicted value.* This step marks the essential distinction between philosophy and science. When a philosopher takes his hypotheses into the laboratory, he becomes a scientist. The essence of science is testing thought. The paradigm for

this step is a carefully identified and measured *independent variable* (such as 500 lbs. per acre of a commercial fertilizer with 6-12-6 composition) and an equally carefully identified and measured *dependent variable* (such as 100 bushels of corn per acre). The former may (but not always) be the cause, and the latter the effect. The independent variable is being investigated and the dependent variable is the result. The latter verifies, or not, what is stated in the hypothesis about the independent variable.

Whether this step is in the form of an experiment or an observation *in situ*, both independent and dependent variables should be carefully identified and measured or qualified in some way. Otherwise, alleged scientific verification may be nothing but propaganda.

Carefully controlled experimental verification may require such complicated quantification methodology that special training and special measuring devices may be essential.

6. *Forming conclusions.* It is foolish to have an experience or perform an experiment to verify some idea and then not learn anything from it. The results of Step 5 should be formulated as fact so that it is available for use in Step 2 in solving future problems. Experience is a good teacher only if the new information is identified as such. The cats in Thorndike's problem box did not learn much from experiences of failure. They repeated errors over and over again because they could not formulate conclusions from each error.

To have greatest future usefulness, the results of a problem-solution procedure should be exactly described. If 500 lbs. of 6-12-6 fertilizer produce 100 bushels of corn per acre, it is important to describe the varied conditions under which this took place. How was the independent variable applied? How deep was the land plowed? What was the rainfall or irrigation? How many times was the corn cultivated? How long was the growing season? What was the quality of the dependent variable? What was the money value of the dependent variable in comparison with the cost of the independent variable? In short, with all factors considered, exactly what conclusions can be drawn from this experiment?

The application of the scientific method to the solution of an adjustment problem of a university student is illustrated by the case of Donald Jones:

> Donald Jones graduated from high school at the age of eighteen, and decided to go to college because that was what his father wanted, and because several of his friends were going. He decided on State University

since it was nearby and his friend was studying there. He enrolled in the School of Engineering because that was the course which his roommate was taking and he had a vague notion that it might enable him to see the world.

At the end of the first semester, Donald's grades were so low that he was put on probation. He studied hard, or so he thought, during the second semester; but he received low grades again, and was called to the dean's office and advised to drop out. This worried him a great deal. He did not wish to drop out and admit failure, and he did not wish to continue and be *kicked* out. Entirely unlike any other situation he had ever faced, this one did not seem to present a solution into which he could drift. The problem would not solve itself, nor could any of his friends solve it for him. His past habits of drifting and relying on others would not work.

Donald was advised to confer with a professor of psychology, and he did so. A careful study was made of his problem and the various factors that seemed to be related to it. When the diagnosis indicated that the solution was rather obvious, Donald was encouraged to apply the scientific method to his difficulty. The following analysis is quoted from Donald's own report.

Problem: How can I avoid becoming a failure in the School of Engineering?

Subproblems:

Do I really want to become an engineer?
Do I have the necessary ability?
Am I better qualified to go into some other vocation?
Do I know how to study?

Data:

Tests showed that I am interested in engineering, that I have adequate ability to become an engineer, that I am not better fitted for any other vocation, and that my mental ability is superior to that of the average college student. However, I do not know how to study effectively. My case history indicates that my past grades were better than I deserved. My father was on the school board and the cashier of the bank, which probably influenced some of my teachers. I was an athlete and the school emphasized sports. (These data answer the subproblems.)

Plan for solution:

I will study under the psychology professor's supervision for a summer term and learn how to study properly.

Evaluation of the plan:

This ought to work, because I floated through high school and did not even try to study. I came from a small town where it would have been unpopular for a teacher to flunk me. Paying this professor to tutor me will be cheaper than scrapping the year I have already spent in school.

Test of the plan:

> I was first required to make out a schedule of what I planned to do every hour of the day. I was not allowed to deviate from this plan, unless the deviation was approved in a conference with the professor. I then learned to read carefully and take notes on the important ideas. This was harder work than I had ever done before, and I was putting in more hours than ever before. At first, I got behind. I could not cover as much material as was assigned. After about a month, things began to be easier. I gradually learned to concentrate, and it did not take as long to get the ideas from a page. At the end of the six weeks summer term, I had learned what to do but was as yet unskilled in doing it. The next fall, I was on my own, but reported to the professor occasionally. The plan worked.

Conclusion:

> Since I have learned how to study, my courses are more interesting and I am making satisfactory marks. My greatest benefit was in learning how to solve problems of difficulty.

The scientific method is merely a refinement, a systematization, of vicarious language behavior. It is more careful, more orderly, more logical, less impulsive and erratic, and definitely more effective than ordinary vicarious problem-solving. It is the method used by great thinkers.[6] This does not mean that all great thinkers are scientists. It merely means that they are systematic thinkers. In problem-solving, the philosopher differs from the scientist only in the types of problems with which he deals and in the testing of his solutions. He is no less systematic, orderly, and exact. He may not experiment in a laboratory, but that is because his problems usually do not lend themselves to such experimentation.

Summary. We can conclude that *problem-solving is a process of overcoming difficulties that appear to interfere with the attainment of a goal.* It is a procedure of making adjustments in spite of interferences.

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[6] The author disagrees with a recent writer who wrote that "There seems to be little evidence that clear thinkers, when confronted by new problems, follow an orderly, systematic step-by-step course in achieving a solution." Great thinking, both in science and philosophy, has been done by trained individuals—those who have learned how to think. Undisciplined minds, although of the rank of potential genius in aptitude, seldom attain prominence. On the other hand, as Edison so often said, success in science is not so much a matter of genius as it is of hard work. Even a mind of mediocre aptitude can make good in science, we may conjecture, because of the method.

Maier found that where he introduced even a bit of system into a problem-solving situation by means of a short lecture on "How to Reason," there was a definite improvement in problem-solving success. See N. R. F. Maier, "An Aspect of Human Learning," *British Journal of Psychology*, XXIV (1933), 144-145.

The various methods of problem solving may be roughly classified in a graded series:

1. Unlearned and habitual behavior,
2. Trial-and-error behavior,
3. Insight behavior,
4. Vicarious behavior,
5. Behavior designated as "The Scientific Method."

Animals solve problems by the first three methods only, whereas man uses all five.

In general, the difficulty of the problem to be solved determines which method of problem-solving must be used. Simple problems can well be solved by instinctive and habitual behavior. More difficult problems require a series of solution attempts, until the successful solution is reached. Problems still more difficult require a degree of understanding, a perception of the relationships between the significant factors of a problem situation. This reduces the chance factor, and consequently, the frequency of error. Still more difficult problems can be solved only by the use of sentence language, which makes imagination possible. In this manner, problems can be pre-solved and the result of a solution can be more accurately predicted. This reduces the chance factor still more, so that a solution trial is less likely to be unsatisfactory. The most difficult problems within the range of man's efforts can be solved only by the "scientific method." This is more elaborate in its application, requires more training for its use, and is more time-consuming in its operation. Even with this method, predictions are often inaccurate and errors are still made.

How can creative thinking, reasoning, and problem-solving be taught?

What are the implications of this discussion for students of education —teachers and prospective teachers? Obviously, children are not born with the readiness to solve problems: that ability must be learned.[7]

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[7] Of course some people believe that man, like the lower animals, has inherited patterns of reaction that enable him to overcome some of his more fundamental difficulties. Granting that the lower animals have unlearned adjustment patterns of behavior that are sufficiently appropriate to enable the species to survive, it is doubtful that these instincts exist on the human level to a degree necessary for adjustment in a complex civilization. Man must live by his intelligence rather than by inherited behavior patterns.

Adults solve problems of adult adjustment in about the same ways they learned them as children. Psychologically, "What the child is to be, he is now becoming."

A further word of interpretation is in order. Earlier in this chapter it was stated that language enables people to observe and describe places, people, things, and events, and to compare them with other places, people, things, and events that are remote in both time and space. Such observation of time sequences has enabled certain individuals, often referred to as "great thinkers," to infer and describe *causal relationships.* Places, people, things, or events that are observed to follow other places, people, things, or events in unerring sequence are inferred to be in causal relationship. If repeated observations substantiated the inference, the relationship was stated as a principle or law. By using such principles and laws, effects could be predicted from observed causes, causes could be inferred from observed effects, and problems could be solved with fewer errors.

Not everyone who uses language, however, is able to discover causal relationships or use such laws in making predictions and inferences with accuracy. The ability to learn principles and to use them in inferring causes and predicting effects is widely distributed among people in a normal frequency pattern. A few individuals have very superior ability, a few have inferior ability, and the largest number are neither superior nor inferior in this respect. This means that individuals having low ability for using principles and making predictions can solve only problems of a low level of complexity, whereas, those of high ability can solve problems of considerable complexity. Regardless of the level of ability to use principles in making predictions and inferences, everyone can learn to become more proficient at his own level. Obviously, it is the business of education to teach children at all levels of capacity whatever information, skills, and attitudes will help them in learning to solve their own problems.

Content of education. The American school curriculum has been determined largely by tradition rather than by the needs of everyday living. Much of what is now learned in school contributes but little to creative thinking, reasoning, and problem-solving ability. Present practices are often defended on the ground that "What was good enough for me is good enough for my children." This sort of education, however, will not send rockets into space, adapt atomic energy to household uses, nor lengthen human life beyond "four score years and ten." What, then, should be the content of education for an age of creative thinking, reasoning, and problem-solving?

1. *Learning to recognize problem levels.* It is not difficult to recognize the presence of a problem. It is difficult, however, to evaluate a problem, to recognize its importance and complexity. How much effort will the solution require, and will the satisfaction of the want involved justify that effort? Only about half the students who enter college ever complete the four-year course and satisfy the want for a degree. They misjudge the difficulty of satisfying this want. Soon after entering college they conclude (because of all sorts of difficulties, such as lack of funds, lack of ability, the priority of other wants, and so on) that the terminal satisfaction is not worth the intermediate effort. This is another way of saying that certain wants should never have existed in the first place.

Some wants have high immediate value and low long-range significance, whereas, other wants have low immediate value and high deferred or long-range significance. For example, the desire to go to a party, or to win a football game, or to make the honor roll may have strong immediate value, but they are unimportant a few years or even a few weeks later. Conversely, the desire to obtain a college degree, or to invest funds in old-age security, or to learn the "touch system" of typewriting may not be very strong now, but future happiness may depend on how effectively these wants are now satisfied. Young people should learn to evaluate the present from a projected viewpoint. Ten or twenty years hence, how will I evaluate this problem? Is the satisfaction of this desire worth the cost?

Sometimes simple wants for immediate satisfaction have consequences that entirely outweigh their worth. The want to satisfy the taste for green apples may cause a belly ache that makes the pleasant taste of the apples seem small in comparison, or the want to spend money foolishly today may prevent the satisfaction of hunger tomorrow. Often the consequences of a particular way or method of satisfying a want may create a greater problem than the one just solved. Successful problem-solving necessitates the ability to recognize both the importance of a problem and the consequences of its solution.

Problem-solving ability depends on two variables—the basic capacity or intelligence of the individual to learn, and whether or not he has learned within that capacity. Some people do not possess the capacity to solve difficult problems. Others have the capacity but simply have never learned how to solve problems. It is the function of education to teach every student to recognize the difficulty level of his own every day problems, whether they be in relation to his school work or to his life outside of school. There is no magical method of learning this. Learning to recognize the difficulty level of problems comes from experience in doing just that. School work must consist of solving problems—problems of work, problems of play, problems of social relationships, problems of national and international affairs. Only thus will students learn how to perform this highest function of organismic behavior.

2. *Learning facts in problem-solving context.* Most people would agree that at least one of the goals of education should consist of learning facts. Students are passed or failed in many courses on the basis of the number of facts they have learned and are able to give back on examinations. Other courses require that students develop a degree of proficiency in the use of facts. For example, a teacher of English may require his students to learn certain facts about grammar and also how to use these facts in writing themes and reports. A physics teacher may require his students to learn the basic facts of electricity; he may also require that they set up a small laboratory generating plant. A geography teacher may require his students to accompany him on field trips and to learn their facts from direct contact with nature as well as from a textbook. Facts learned in isolation from their use are likely to be mere verbalizations that can be written on an examination but not used in solving problems. Useful knowledge should be learned in use.

As already emphasized in this chapter, the goal of education should be to teach children how to solve problems arising from hindrances to the satisfaction of their wants. A cardinal principle of learning is that *what* is learned is determined by *what is done* in the process of learning. Facts learned out of context are retained as so much dead knowledge, but when learned in the process of solving problems they are retained as dynamic knowledge ready for use again in solving future problems. Projects such as publishing a school paper, conducting mock legislative assemblies, participating in student self-government, operating a school farm or repair shop or cafeteria, are all practical ways of learning facts and fundamental principles *in context.* Laboratory experiments and classroom demonstrations, not only in the basic sciences, but in any course where facts and skills and principles are to be learned, are useful in creating situations to illustrate *facts in function.*

3. *Learning to be original.* The ability to "think new thoughts,"

or as designated in the title of this chapter, to "think creatively," is not so mysterious as it may appear to those who have been too awed by the concept to even study it. Creativeness and originality are simply processes of arranging well-known facts and principles in new relationships so that wants may be satisfied more effectively. For example, a hundred years ago two well-known facts about cotton were: (1) that cotton seed was heavier than cotton fiber and (2) that the fiber could be pulled or snatched away from the seed. Since pulling the fiber from the seed was a slow, tedious process done by hand, it seemed desirable to a man named Eli Whitney that this operation be performed in an easier way. He found that he could drag a jagged stick rapidly through a pile of cotton and pull out a small amount of fiber without any seed. A hand saw would do this even better. Best of all was a revolving saw. However, the fiber could be removed from the saw teeth only by stopping the saw. A circular brush was then devised which, by revolving faster than the saw, would brush the fiber from the saw. *This was the cotton gin.* Original? Yes. Creative thinking? Yes. Mysterious? No. Common knowledge had been applied in a new way to achieve a new purpose.

Such creative thinking can be learned—but only when two fundamental conditions have been established. First, there must be a need to be satisfied, a difficulty to be overcome, a problem to be solved. Whitney was trying to satisfy the need for a better way to separate cotton fiber from cotton seed. He was motivated to search for a solution to this problem. Second, there must be a knowledge and comprehension of essential facts and principles; otherwise creative thinking can never occur. If Whitney did not know about specific gravity and centrifugal forces as they applied to his problem, he could never have invented the cotton gin. Motivation and information are prerequisites to creative thinking.

Perhaps the reader is now aware that a "creative idea" is the third step in the "scientific method" as outlined above. Whitney's idea of revolving a circular saw to jerk cotton fiber from cotton seed was his "hypothesis." This was the *creative* step. It was then judged to be of worth (Step 4), and "tried out" (Step 5) with the construction of the first crude model. This is the pattern of all creative thinking. There is first a need to be satisfied; then adequate information about the need and the difficulties that may hinder its satisfaction; and then the creation of an idea or hypothesis about how to satisfy the need, followed by judging its worth and trying it out. Only thus can intelligent originality develop.

4. *Learning to make accurate evaluations.* Perhaps the ability to make logical evaluations—whether of wants, of the significance of facts and principles, of the worth of various ways of solution, of the effectiveness of testing procedures, of the implications of the success or failure of certain solutions—is not so much a matter of learning as it is of inheritance. Certainly this ability is highly correlated with IQ. However, within IQ limits or on a given IQ level, anyone can learn to make more accurate judgments of value. Basic in this learning are (1) a delay of decision and (2) an accumulation of information about the occasion for judgment so that its level of difficulty is reduced.

Postponement of a judgment is often crucial to its accuracy. Snap judgments are wrong more often than are delayed judgments. This statement, "I will sleep on it and let you know tomorrow," should be made more often. A high-pressure salesman knows the error of allowing a prospect to put off a decision to buy until a later time. Delay allows the prospect time to talk the situation over—both with himself (called thinking) and with others—and review the facts both known and unknown. It gives him time to consider other alternatives, to evaluate the consequences of a decision to buy or not to buy, from a future reference point, and to become convinced of the wisdom of a course of action. Intelligent judgment on any level takes time.

Information always simplifies a judgment. No decision would be difficult if enough facts were known about the affecting conditions. A person who knows a situation well, either from primary experience or from study, is qualified to make decisions within that situation. This is the fundamental principle on which our American judicial system is based. A court trial is an occasion for bringing out facts that enable the judge or jury to make a just or intelligent decision. Respect for fact marks the distinguishing difference between the great executive, whether in business or government, and those of lesser rank. "Show me a young man who is trained in fact-finding and I will show you a potential future executive," remarked the president of a large American corporation. Great men make great decisions as determined by fact.

The ability to make accurate evaluations also determines the worth of a person's opinions. For example, the opinion that smallpox vaccination is not necessary for protection from that disease is inconsistent with fact and therefore a worthless opinion. The opinion that fertilizer will increase the yield of an acre of wheat is consistent with fact and therefore a worthwhile opinion. The opinion that the world will come to an end on July 4, 1965, is neither consistent nor inconsistent with fact. It is pure nonsense. Opinions may range from those justified by fact, through those about which there are no facts, to those that are inconsistent with fact. Whatever they are, opinions are determined by the ability to make accurate evaluations.

5. *Learning how to test thinking.* The basic difference between superstition and science is "tested thought." Civilization began when primitive man first investigated the accuracy of some of his fears and superstitions. Although successive generations have preserved both the superstitions and the tested thought of the past, superstitions are now decreasing and tested thought, or science, is increasing. The dogmatic cliches of the "silver-tongued orator" and the medicine man are rapidly being supplanted by the carefully tested facts of the scientist. Superstitions, opinions, and beliefs are now tested for accuracy. The twentieth century is an age of tested fact.

Learning how to test thinking is synonymous with learning how to experiment, how to make surveys, how to observe with metrical precision, how to count and measure amounts, and especially how to devise apparatus and tools for doing these things. In short, learning how to test thinking is the procedure of science known as the "scientific method."

It is not necessary to study formal courses in science in order to learn the scientific method. Any course in which facts are verified, or accuracy is checked, or beliefs are investigated, is a course in scientific method. Tested thought is not the prerogative of science alone. It is an attitude that can be applied to any situation where opinions exist. When a lawyer double-checks his facts, or an artist verifies the truth he portrays on canvas, or a politician investigates before he accuses, or a reporter publishes only the facts he knows to be true, or a neighbor confirms a rumor before it is passed on—that person is being scientific. He is testing thought. Learning to test thinking is a habit, an attitude that is acquired in daily living, both in school and out. It is a "way of life."

The method of education. How can creative thinking, reasoning, and problem-solving be taught? American leadership in the world today is being challenged on every front by cultures and governments both younger and older than ours. We may be falling behind in science, diplomacy, music, art, athletics, literature, engineering, agriculture, and military power. Why? The answer most generally given is that our educational system is ineffective. It is anachronistic. It does not fit the needs of an atomic age. The so-called immutable principles of our culture have somehow become mutable. Our venerable forefathers did not have all the answers. The curriculum that was "good enough" for a "horse-and-buggy age" is not good enough for a "space-travel age." The so-called cultural courses that "ladies and gentlemen" allegedly need for the enjoyment of leisure must be supplanted by more mundane courses in the sciences of agriculture, engineering, military tactics, transportation, psychology, chemistry (in all its applications), geology, genetics (including human beings), parasitology, and many others. Apparently, if we are to survive as an independent nation, we must educate our children for life as it is today, and not as it was in an age now gone.

This is another way of saying that our boys and girls must learn the facts of science by the method of science. In so doing, they will acquire all the cultural heritage that is significant for survival. In the words of Dewey, once again, *what* to think is not nearly as important today as *how* to think.

All this sounds like good sense for training scientists, but what of the education for all the many occupations that are not scientific? How should we educate salesmen, truck drivers, housewives, policemen, motel operators, meter readers, and all of the others? Or, are all these occupations to become branches of science, too? The answer is that no useful distinction can be made between facts in a laboratory and facts in ordinary living. Certainly all occupations are governed by scientific fact. Whether we like it or not, we are living in an age of fact. Our decisions in routine daily living are determined by fact, with superstition becoming functionally more and more unimportant (although much lip service is still given to modernized versions). We no longer consult the gods before we plant corn, or take a trip, or treat the sick. We have reduced ritualistic mumbo jumbo to a minimum except on certain occasions. We now plant corn, take a trip, and treat the sick as determined by the facts of scientific research. We can now pull many of the causal strings of nature and determine events, instead of appealing to the capricious gods of superstition for crumbs of favor. We live in an age of scientifically controlled events. All occupations are governed by facts produced by scientific research.

Consequently, the inescapable conclusion is that the content of education must be scientific facts in all their wide variations, and the over-all method of education must be the six steps of scientific problem-solving. From kindergarten to post-doctorate levels, students will study the facts and principles of science—what is now known, what is now in the process of being discovered, and what is yet unknown. They will study scientific facts and principles as they exist in the inanimate world—astronomy, physics, chemistry, geology—as they exist in the organic world—zoology, botany, genetics, cytology, and as they exist in the world of social relations—sociology, government, anthropology, cooperation. As children mature from one ability level to the next, they will broaden the range of information and increase the difficulty of their comprehensions. Although the range will always increase, somewhere each child will progress faster in a limited area. This will be the first step toward his specialization. From here on, he will be limited only by his own aptitudes, health, aspiration, and character.

Such education will have two major values. First, because of the broad acquaintance with factual information and scientific principles, students will be less ready to accept distorted propaganda about other people in other parts of the world. They will recognize prejudiced statements as being inconsistent with scientific fact. Men trained in testing facts will be less influenced by the verbiage of propaganda. Cooperative exchange of both raw and processed materials, of specialized services, of scientific information, of tools and machinery will be less hindered by deliberate misrepresentation of facts about the peoples of other nations. Perhaps even propaganda for jungle warfare will become less effective and civilization may not destroy itself for a "mess of porridge." Second, scientific education, with the elimination of superstition, can satisfy the want for food, shelter, and clothing for every human being alive. Even today we have the "know-how" to raise enough food to feed, shelter, and clothe the world. The expressed ideals of men of good will everywhere may yet become a reality by the simple procedure of teaching the next generation *how* to think instead of *what* to think.

Modern psychological research with both rats and humans has taught us some guiding principles of learning that apply to problem-solving behavior as well as to other types of learning.

1. *Learning to solve problems is facilitated by feelings of need or want.* This is another way of saying that learning behavior must be motivated. The behavior to be learned will not be performed unless

it is needed to reach some goal. A rat will learn to operate a mechanism, or a series of mechanisms, only if he is in a state of some sort of deprivation—usually for food. He must be hungry. He must be looking for something before he will learn how to find it. Likewise, the school child must have some feeling of need, and his school learning behavior must be the means of satisfying that need.

Motivating school children to *want* to learn the facts, skills, and principles now demanded in the conventional school is a big order. Some school children are not interested and have no real need for arithmetic beyond the primary level, or for language skills beyond those acquired before they entered school, or for geography information beyond that of the immediate neighborhood (which they can acquire in exploration outside of school), or for acquaintance with any literature beyond the "comic strips." In fact, the average school child can satisfy his *primary* needs very well without going to school at all. He has no immediate direct need for what the school tries to teach him. We may ask the question, of course, "Why should the child go to school?" What is wrong with being illiterate? The answer is that effective adult living requires so much knowledge and so many skills that they cannot all be attained on the adult level. Adult living requires preparation. The school is by intention an institution for living here and now and for getting ready for adult living. Whether he needs it now or not, the child must acquire some basic knowledge and skill that he will most certainly need when he grows up. Our problem is not how to justify the existence of school but rather how to motivate the learning that should take place there.

Psychological research with white rats in learning-situations has shown that the rats will learn to perform any number of preliminary and unrelated acts of behavior *if they terminate in satisfying his want for food.* For example, rats can be taught to first press a bar that releases a marble, then to roll the marble into a hole that trips the latch to open the door to the food box, then to enter the food box and press another bar which causes a pellet of food to fall to the food tray. The wanted food is obtained by a series of chain reactions that constitute the only way of obtaining food. The series of acts necessary to obtain food are as follows:

1. Press bar to release marble,
2. Roll marble into hole,
3. Enter food box,

4. Press bar to release food pellet,
5. Obtain food pellet from food tray.

We can conclude that any other sort of behavior could be learned to attain the wanted food, if that behavior is a necessary prerequisite. The means to a reward do not need to be causally related to that reward to be learned—just prerequisite.

It was also learned in these experiments that the chain of prerequisite events must be *learned in reverse.* Starting with the food, the last act performed to get the food (pressing the bar) was the first act learned in the series. The next act learned was entering the food box. After these two acts were learned, the rat then learned to roll the marble into the hole, and last of all he learned to press the bar that released the marble. The order of learning was as follows:

1. Obtain pellet from food tray,
2. Press bar to release food pellet,
3. Enter food box,
4. Roll marble into hole,
5. Press bar to release marble.

The food reward was gradually generalized to stimulate each act of behavior preliminary to obtaining the food. First, it motivated the rat to press the bar that released the food. Second, it motivated him to enter the food box so that he could press the bar to release the food. Third, it motivated him to roll the marble into the hole, which opened the door to the food box, which he could enter and press the bar to get the food. Finally, the food motivated the rat to press the bar that released the marble, which he could roll into the hole and open the door to the food box, so that he could enter and press the bar that caused the food to fall into the tray. Food as a stimulus had become generalized.

Other objects and events attained secondary reward status because they were means of attaining the primary reward—food. For example, the marble became a secondary reward because it was the only means of getting the door to the food box open. Also, the marble was the *immediate* reward for pressing the first bar, just as the opening food box door was the immediate reward for rolling the marble into the hole. The marble became a token of value that could be exchanged for something else of value.[8]

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[8] Rats will hoard such tokens, as we hoard money, for later use in obtaining the primary food reward. Also, such symbolic rewards may become generalized and motivate a variety of behavior.

We may summarize our information from the rat experiments regarding learning as follows:

1. Rats will learn to perform a series of acts if they terminate in attaining the primary reward.
2. In a series of acts leading to a primary reward, those acts nearest to the reward are learned first.
3. Any intermediate object or event in a series leading to a primary reward may become symbolic of the primary reward and attain reward value itself.
4. Any primary reward or any secondary (symbolic) reward may become so generalized that it will motivate a wide variety of behavior. (The rat can learn to use the marble to satisfy thirst as well as to satisfy hunger.)[9]

Education is already making use of much of this information. For example, we use secondary rewards (grades, honors, recognitions, honor points, and so on) that have attained value by symbolizing certain primary rewards (social status, parental admiration, varied privileges, and others). Both may become so generalized that they motivate all sorts of school learning ranging from writing themes in English, to performing experiments in chemistry, to memorizing the *Chambered Nautilus*. At the same time, education ignores some very basic things learned in the rat experiments. For example, the longer a reward is delayed after the behavior, the weaker it becomes as a reinforcement of learning.[10] When examinations are not graded immediately, or when school grades are delayed until the end of the term, they have lost much reinforcing value. Learning behavior must be reinforced immediately, by either primary or secondary rewards, whether in a rat experiment or in the school classroom.

Another mistake frequently made by educators is to use secondary rewards as though they had inherent value instead of mere symbolic value. Grades should not be emphasized as though they were ends in themselves instead of symbolic of more basic rewards—social status, parental approval, job-getting appeal, acceptance for higher education, and so on. No pupil wants an "A" as such, more than an "F" as such, until the symbolic value of each has been well established. The rat will not try to get a marble until he has learned its value in getting food. The child must be taught the value of secondary rewards by experiencing their value in attaining primary rewards. Secondary rewards must themselves be rewarded by exchanging them for primary rewards. Grade status, as prerequisite to playing on the football team, gives meaningful value to grades.

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[9] B. F. Skinner, *Science and Human Behavior* (New York: The Macmillan Company, 1953).

[10] Any act that is immediately rewarded, or reinforced, is likely to become a part of the routine of striving for that reward in the future. For example, if the mechanism in a food box clogs and the pellet is slow in falling to the food tray, the rat may scratch himself or raise up on his hind legs while waiting for the pellet to drop. This chance behavior is thus reinforced and is likely to be performed in the future as an integral part of the rat's food-getting routine. Any chance act that immediately precedes a reward is likely to become a part of the behavior of attaining that reward. This is called "superstitious behavior" and explains the origin of such behavior on both the animal and the human levels.

Closely related to this is the failure of educators to promote the generalization of grades and other secondary rewards, by exchanging all sorts of desirable rewards for grade status. Playing on athletic teams was just mentioned. Grade status should also be a pass to participation in any event, honor, activity, or membership that the school controls or can control. The more doors good grades open, the more weight they will have in motivating school learning. All kinds of needs and wants should be satisfied by good grades. By such generalization, grades and points can become potent motivators of any desired school learning.

2. *Learning to solve problems is facilitated by rewarding each step in the problem-solving process.* Solving problems successfully has a "feedback" effect that increases the probability that other problems will be solved successfully. Successful or rewarded behavior is learned more readily than unsuccessful or unrewarded behavior. Animal experiments have proved that the most complicated behavior can be learned if it is broken up into small units that are individually rewarded as they are learned. For example, a rat was taught to climb a small ladder to a shelf, and then pull a cord that raised the ladder to a second shelf. He again climbed the ladder and again pulled the cord raising it to a third shelf on which was a tray of food. This complicated behavior was learned, one step at a time, with rewards given for each unit of learning. First the rat climbed the ladder and was given a food reward. After he had learned this unit, the food was withheld until he touched the cord with his paws; a small unit, but it brought the cord into the situation. Now the food was given for both climbing the ladder *and* touching the cord. Then the food was again withheld until the rat *pulled* on the cord. The food was now a reward for climbing the ladder and pulling the cord. This procedure was extended until the cord-pulling

elevated the ladder to the next shelf. Small units were added to those already learned until the entire chain of behavior described above was learned.[11]

The implications of this procedure of learning for education are not new, but they are definite. The child should learn by small units and should receive a valued reward for each. Teacher praise, special privileges, grades, grade points, honor stars, may all be used as rewards for unit accomplishment. The last two may be used as "tokens" and exchanged for more valued terminal rewards. Whatever is considered worth learning can be taught by this procedure. The only requisite is that, if the rewards are symbolic or secondary (that is, tokens), their value as a means of obtaining primary rewards first become established.

This necessitates careful programming of educational content and educational procedures. First, elementary levels of materials and behavior must be learned unit by unit, with adequate rewards. If the materials are complex, the units must be smaller and the rewards more frequent. As each unit is learned, the reward is delayed and another unit added. The unlearned is tied to the learned, and both are reinforced by the same reward.

Even on the lower grade levels, children can learn to solve simple problems by the scientific paradigm. Each child can learn to *define* his problem carefully as the first step in attaining a goal. He can learn to state in simple terms just what he wants. For this he must be rewarded —with praise, a grade, honor points, anything the child considers of value. Next he can learn to *discover the facts* about his problem. He may learn that his want is too difficult to attain, or not worth the effort of attainment, or can be readily attained in a certain way. For thoroughness in learning facts about his problem he must again be rewarded. Other steps in the paradigm can be learned in the same manner—in small units frequently rewarded. Then, as he grows older and goes to the higher grades, he will take with him not only knowledge, skills, attitudes, and interests, but a method of solving problems characteristic of the very highest level of attainment yet reached by man.

3. *Learning to solve problems is facilitated by solving problems in the area of desired learning at the complexity level of the learner.* This is the "Law of Exercise." It is sometimes stated: "As the twig is bent so the tree will grow." It means that what is learned depends on what

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[11] This experiment by Dr. Loh Seng Tsai of Tulane University is available in a motion picture for classroom use.

is done in the learning process. The product of education is determined by its procedure.

It should be observed, however, that practice or drill alone will not result in learning. Thorndike[12] many years ago found that when blindfolded human subjects were drilled in drawing "four-inch lines with one quick movement," a total of 3,000 times without "knowledge of results," there was no increase in accuracy. The lines drawn in the thirtieth session were no more accurate in length than were the ones drawn in the first session. Practice or drill is not a law of learning unless there is also reinforcing progress in approaching a goal. A goal or motive, a result or success, and repetition or exercise—all three in combination result in efficient learning. If Thorndike's subjects had been motivated to want to draw four-inch lines accurately, and if they had been rewarded by information of progress, then the drill in drawing the lines *would* have resulted in greater accuracy. First, motivate; then, reward; and then, drill; these *together* are the laws of learning.

The implication of this trilogy of learning principles for education would seem to be clear. We can teach proficiency in problem-solving if we first motivate our pupils to want the rewards we are able to give them for learning to be proficient; then, issue rewards promptly for each small unit of progress; and finally, repeat the procedure over and over again until the desired level of proficiency has been reached.

Summary

Any kind of curricular content can be taught by the method of reflective thinking, reasoning, and problem-solving. The educator's task is not how to teach problem-solving but rather how to teach history and geography by the method of problem-solving. Facts and skills are more meaningful and more likely to transfer for use in future situations when they are learned in the process of solving problems than when they are learned as discrete information and isolated skills. These problems can either grow out of the child's natural environment or they can be created by the manipulation of that environment. Any lag of interest that may occur for problems created in the classroom can be rectified by the judicious application of the laws of learning—motivate, reward, and drill. The spectacular "tricks" that animal trainers are able to teach their "pupils" by the use of these laws show adequate evidence of their effectiveness. Stated again, for emphasis, these laws of learning are:

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[12] E. L. Thorndike, *Human Learning* (New York: Appleton-Century-Crofts, Inc., 1931).

1. Create a want that can be satisfied only by learning the desired behavior. (The want may be for tokens that can be exchanged for the satisfaction of greater wants.)
2. Reward any degrees of learning with degrees of satisfaction of that need.
3. Provide opportunity for the repetition of the desired behavior until it is learned.

When translated into rules of classroom guidance, these laws may be stated thus:

1. Establish symbolic rewards in the form of grades and grade points that can be exchanged for all kinds of school privileges, such as participation in sports and social events, membership in honor clubs, citations for achievements, and so on. In other words, build up a "money" system so that school "tokens" will have generalized value and will be wanted.
2. Program all desired learning so that it can be attained progressively, with grade point rewards given immediately for any degree of achievement. Each pupil should know at all times how much reward he has earned and the value of that quantity of reward in exchange for various privileges.
3. Provide for repeated behavior (with additional rewards) until a desired level of learning, or chain of behavior, has been attained.

QUESTIONS AND EXERCISES
for discussion and study

1 What is the relation between problem-solving and environmental adjustment?

2 What are "correct solutions?" Are these affected by conventionality?

3 What are the dangers of problem-solving under an autocratic government?

4 Should there be a limitation on "freedom of thought" in a democracy?

5 Is the laboratory experiment of a typical course in physics or chemistry an example of problem-solving? Explain.

6 How is the "project method" in education related to problem-solving?

7 In what respects has organized language promoted the development of the problem-solving process?

8 Evaluate interscholastic debating as a means of teaching students how to solve problems.

9 Evaluate court-room trial procedure as a means of solving problems.

10 Evaluate mathematics as a procedure for teaching students to solve problems.

11 Evaluate the procedure of "small-group decision-making" as a means of teaching problem-solving.

12 How can one be a creative thinker without being a problem-solver and vice versa?

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CHAPTER 20

Learning the basic school subjects

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THE TASK OF DEVELOPING and guiding a major portion of the learning activities in our schools so that they will contribute to the development of desirable character traits, attitudes, and other personality qualities is probably the most important function of the schools of today. The responsibility of the teacher for guiding the learning of children is based upon the following fundamental axioms:

1. The child, as a total being, is the central factor in any elementary-school program. His presence in school furnishes the sound basis for an educational program.

2. Learning at school cannot be divorced from learning at home and in the community.

3. Learning activities at school should concentrate on behavior changes that can best be produced through experiences in a school environment.

4. Learning in school should be most concerned with those behavior changes that are in the direction of the desired goals of education.

Language

Language is closely connected with organized learning activities. A child's equipment and adeptness in language usage determines in large measure not only how well he learns but the extent to which his learning functions in his total behavior. Language is a means of expression, and expression is necessary for communication. The pupil who is apt in the use of language will be able to think better, and will make himself understood by his classmates and others. On the other hand, the individual who is emotionally maladjusted will have difficulty in thinking and comprehending.

Interrelations of language abilities. The close relationship among the four language arts—speaking, listening, reading, and writing—has been studied by a number of investigators at different age and grade levels. Feu [1] used as subjects 140 children from the fifth and sixth grades of four elementary schools in an intensive investigation of the interrelations of oral reading, oral reproduction, and written reproduction. The results of this study indicate that there is a substantial degree of relationship among reading material, oral language samples, and written language samples of fifth- and six-graders in the following: verbal memories evoked, number of words used, number of different words employed, number of hard words, number of phrases, and degree of subordination.

In a study by Hughes [2] bearing on this problem, language ability

Table 20-1

Intercorrelations between certain language abilities

Word Meaning and Spelling	.64
Word Meaning and Reading	.61
Word Meaning and Language Usage	.52
Reading and Language Usage	.56
Reading and Sentence Sense	.55
Reading and Paragraph Organization	.53
Reading and Punctuation	.50

SOURCE: Hughes, *op. cit.*

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[1] H. R Feu, "Interrelationships among Materials Read, Written, and Spoken by Pupils of the Fifth and Sixth Grades," *Journal of Educational Psychology*, XLIV (1953), 169.

[2] V. H. Hughes, "A Study of the Relationship Among Selected Language Abilities," *Journal of Educational Research*, XLVII (1953-54), 97-106.

tests in eight skill areas were administered to 332 fifth-grade pupils. Intercorrelations were obtained from the results of these tests. The language abilities in which the greatest amount of relationship was found are shown in Table 20-1. The correlations, in general, tend to show that each of these selected language abilities reported is related in a positive manner to the other language abilities independent of the effects of intelligence.

The importance of language experience. The roles of maturation and experience in language development were presented in Chapters 7 and 9. The development of the child's language ability is gradual in nature. The notion that certain skills must be completely mastered at a particular grade level is unsound. Paced learning that involves a continuity of language experiences in the different grades is essential if the child is to be able to deal with language problems of an increasingly complex nature. There are many situations in the classroom and elsewhere that provide backgrounds of language experiences. The teacher should be conscious of these and of the child's needs for language expression. Some guiding principles for helping children grow through language experiences are the following:

1. Language development takes place in harmony with maturation and experience.
2. Language development will occur best in situations where children have something to say and are motivated in saying it.
3. Language must be considered as a part of the total life of the child and not limited to a class period.
4. Language development proceeds best when there is a program that provides for a functional need for language.
5. Language development at all stages is an individual matter.

Language improvement. Language growth during the early school years may be seriously impeded by too much emphasis upon correct form. A free and informal atmosphere is important for good language development at any level of growth. A desire to use good English will lead to more lasting results than a complete memorization of grammatical form. This necessitates training in the appreciation of good language and literature, together with the development of a more critical attitude and an increased social sensitivity to language errors. Materials must be interesting and adapted to the developmental level of the pupils for whom they are designed. Furthermore, such materials must relate to the backgrounds of experiences of the pupils. It should be remembered that language is the medium through which one conveys his individual emotions and thought reactions to a group as a whole. In the development of language habits, the pupils should not be concerned too greatly with the thought content; however, it must not be inferred here that language habits and content are unrelated. Meaningful and interesting experiences as well as reading content provide splendid materials for language practice. Correct language habits must be practiced. Oral and written work should provide materials that will afford an opportunity for that practice and, at the same time, motivate the student in his language development.

Many teachers have found that the inductive approach to the teaching of correct expression stimulates thinking and increases interest on the part of the students. Students often despair about the application of special rules to English. When they are furnished with examples that illustrate different degrees of excellency of expression, and are requested to choose the example that depicts the best manner of expression, their judgment frequently exceeds the expectations of the teacher. Their ability to select the best means of expression suggests this approach as a starting point for teaching grammar. It also provides a reason for having them judge the merit of their own sentences, and those statements that appear clumsy and awkward. All of this furnishes further evidence of the value to be derived from motivation and meaning in the learning process.

Learning a modern language

The reading method of learning a modern language has been contrasted with the grammar-translation approach. The period following World War II was characterized by an emphasis on the conversational aim, which was given an impetus by the Army Specialized Training program. It is obvious that the instructional program must be geared to the aims set forth for foreign language instruction. Also, the instructional program will be conditioned by the maturity level of the individuals learning the language.

Influence of the age level. Ordinarily, the learning of a foreign language should begin early. Experiences in the schools of Europe and certain cities in America have proved that elementary-school pupils are capable of learning a modern language, and because of their imaginative capacity and play spirit, can be readily motivated in the learning process. Furthermore, it is much easier to develop the correct pronunciation at this stage. The adult is likely to persist in pronouncing words according to fixed habit patterns—for instance, *enfant* (the French word for child) is made to sound like "in'fant." The elementary-school child is also a readier imitator, which helps him to acquire skill in correct pronunciation at an earlier age. Learning to read a modern language is often made difficult by the types of reading materials available. Books written in simple language are likely to comprise the sort of material that appeals to children.

The "organic" theory. In learning a foreign language, the use of words already in one's vocabulary appears to come first in psychological order. The importance of auditory comprehension in the learning process has been emphasized by George Scherer.[3] Such a skill can be developed in large beginning classes, or can be acquired through individual attention to special recordings. Concerning the value of this in relation to reading, Scherer states: "By stressing auditory comprehension we are giving the student ample opportunity to acquire a good pronounciation through imitation. The importance of a consistently good pronunciation in learning to read can hardly be exaggerated. . . . This is especially true in the reading of unfamiliar languages."

The *organic* conception of language development stresses the conversational phase of language from the start. Class activities are more highly socialized, and language growth is further aided through the student-centered activities of special language clubs. Special cultural programs, dramatizations, creative activities, special translations of modern literary productions, and the like furnish means for stimulating interest in foreign languages and provide opportunities for growth in language skills. When reading, writing, and speaking a foreign language are correctly correlated, practice in one of these techniques will contribute to the learning of the others. Such an approach would not leave out grammar entirely; it would simply not center the language program around grammar. Just as grammar grew out of language, and not language out of grammar, so should the learning process first be concerned with language development. The learning of grammar should be introduced as a means of assisting the learner in the development of correct language skills and abilities.

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[3] G. A. C. Scherer, "Reading German with Eye and Ear," *Modern Language Journal,* XXXII (1948), 179-183.

Extensive versus intensive reading. The findings from research studies related to reading are also applicable to the development of a foreign language vocabulary. With the use of extensive reading materials, pupils are able to develop a rather competent reading mastery of a new language in two years. Studies show, further, that such a mastery is not developed by the grammar-translation procedure in so short a period of time. The optimum amount of grammar for the development of reading ability in a modern language is not known, but two general conclusions may be presented. These are: (1) much of the grammar materials given in conventional foreign language work have practically no direct relationship to reading; and (2) the real need in the development of reading is primarily for *recognition grammar*, rather than for grammar learned for recall.

Reading

The conclusions of the study by Hughes, referred to earlier in this chapter, reveal the interrelatedness of reading with other language abilities. An implication from this is that the developmental reading program might well be the focus for a great deal of the general language arts program. Another important implication from this study concerns the importance of word meaning, particularly in reading, spelling, language usage, and paragraph organization. The general results of this study suggest that "there is a reservoir of 'general language ability' that exerts a common influence on both word meaning and language usage, and word meaning and paragraph organization."[4] This reservoir of language ability furnishes the learner with the media for grasping understanding from reading and listening activities.

Learning to read. Learning to read follows a developmental sequence. In the beginning stage of learning to read, the child learns that symbols (words) stand for spoken words. For instance, the word "house" that he sees in print stands for the word "house" as he hears it spoken. Since the association is between the printed word and the spoken word, it is essential that the printed words are chosen from words in the child's vocabulary. If the child is in a state of readiness for learning to read, skill in word recognition grows, and as time goes on occurs at a faster rate. The child's reading vocabulary grows, and soon he is able to recognize meaningful patterns of words in phrases and sentences. All children do not follow the same exact procedure in learning to read, although in all cases there is an association between the printed word or words and the child's comprehensible vocabulary. A number of methods are used to help children learn to read—visual, auditory, manual, phonetic. The successful teacher will use these separately, together, and in various combinations to meet the problems of individual differences that prevail among pupils even when beginning to learn to read.

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[4] Hughes, *op cit.*, p. 105.

Growth in reading comprehension. Growth in reading ability involves comprehension of increasingly larger thought units or sentences and paragraphs. This will ordinarily take place at a relatively rapid pace once the child has developed a usable reading vocabulary. However, this growth requires an extension of his experiences, including his own oral vocabulary. Improved reading skills enable him to extend further his experiences and understandings through reading materials in varied areas. The reading materials should be carefully chosen in harmony with the child's reading ability, and should become increasingly more difficult as he grows in reading comprehension. Reading in the fourth, fifth, and sixth grades is characterized by increased speed, greater comprehension, and more attention to the understanding of the materials read.

The results of a study by Hampleman showed that listening comprehension is significantly superior to reading comprehension among fourth- and sixth-grade pupils.[5] This difference is greater for easy than for difficult materials. Also, an increase in mental age appears to decrease the differences between listening and reading comprehension.

Difficulties in learning to read. Anderson reports that, in the sixth-grade classes of a suburb of Detroit, there was a range of reading ability of seven years, the lowest grade level being 3.5, and the highest, 10.5.[6] An analysis of the factors that contribute to reading disability will give a better understanding of why children have difficulty in reading. These may be classified as follows: (1) constitutional factors, such as visual defects, auditory defects, susceptibility to fatigue, and other physical defective conditions, (2) subnormal intelligence, (3) emotional factors, such as emotional conditioning against reading, lack of self-confidence, and emotional immaturity, (4) educational factors, such as poor habits developed during the early stages of learning to read, poor adjustment of reading material to the child's mental and educational level, (5) psychological factors, such as lack of interest or inadequate motivation and lack of readiness, (6) environmental factors, such as lack of cooperation between the home and the school, poor attendance at school, undesirable sleep conditions at home, and other factors.

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[5] R. S. Hampleman, "Comparison of Listening and Reading Comprehension Ability of Fourth and Sixth Grade Pupils," *Dissertation Abstracts*, XV (1955), 1757-1758.

[6] I. H. Anderson, "Individual Differences in Reading Achievement," *University of Michigan School of Education Bulletin* (Jan., 1949), pp. 49-50.

It has already been suggested that many of the difficulties in reading are due to inadequate language comprehension. Hagin concludes from a study of reading retardation that such a retardation on the part of the elementary-school child is closely associated with inadequacy in other areas of the language arts.[7] Studies of reading difficulties also show a close relation with adjustment problems. These difficulties may be causes, concomitants, or the results of adjustment problems. The importance of emotional security in the home has been emphasized by a number of students of this problem. Preston's studies show that reading failure may result from undue parental pressure for educational achievement.[8]

Spelling and writing

The functional needs of spelling arise when the child has an occasion to write words. A continuous need for writing simple words implies a need for instruction in spelling. Spelling materials should be an outgrowth of the child's experiences, and should be correlated with other materials and activities of the school program. Spelling needs may arise from a trip to the park or a visit to a museum, or from recording an experience in the classroom or on the playground. In such a case, spelling serves a definite purpose in the life of the child, and is a part of his total educational development. The importance of a need or purpose also applies to writing. The need to record things seen at the park, or to write an invitation to a parent or friend to visit the school, demands of the child writing as well as spelling ability.

Learning to spell. Just as the emphasis in reading is that of meaning and purpose, the emphasis in spelling should be on meaning and the reproduction of words needed for written communication. Learning to spell on the part of elementary-school children should have its beginning with words used in written communication.

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[7] R. Hagin, *Reading Retardation and the Language Arts: A Comparative Study of the Functioning of Retarded and Non-Retarded Readers in a Group of Behavior Problems*, Ph.D. Thesis, New York University, 1955.

[8] M. I. Preston, "Reading Failure and the Child's Security," *American Journal of Orthopsychiatry*, X (1940), 239-252.

The teaching and learning of spelling is not a simple rote-memory process. It is a complex functional process involving other aspects of the language arts. In its initial stage it involves copy experiences, although these have purpose and meaning. Instruction in reading, language, and handwriting, which should be closely interrelated, contributes to readiness in improving one's spelling vocabulary. This precept is in harmony with the notion that spelling ability is a developmental ability, and has its roots in the various language skills. The program should be viewed as a series of developmental stages that can best take place through paced learning on a functional and meaningful basis. There is, however, a need for practice and drill so as to increase the permanence of learning. A study reported by Mason showed that drill exercises in word discrimination with sixth-grade pupils produced significant gains in both word discrimination and spelling.[9]

The learning of spelling is made difficult by the fact that learning to spell one word may help in the spelling of some unstudied words, whereas, on the other hand, it may make it more difficult to spell others. Learning to spell *spotted* may interfere with the spelling of the word *spot*. Also, learning to spell *graze* may interfere with the spelling of the word *grazing*. Usually, however, learning to spell the base word makes it easier to spell the derived form. The study of a few simple rules that cover a great many words and do not have too many exceptions may be helpful in the learning of spelling. Such rules should not be learned during the early stages of learning to spell, but should grow in a large measure out of the pupil's experiences. Such a procedure is likely to lead to an increase of transfer based upon generalization.

Another problem concerns the simultaneous learning of the spellings of words of similar sounds but different meanings and graphic forms. A number of scientific studies have been conducted bearing on this problem. Watson concludes from her study, "There is, however, no proof either in this [study] or in Pearson's [or in any other reported, to our knowledge], that presenting the two homonyms of a pair together is the best of all possible methods." [10] In harmony with the principles set forth in the chapters on learning and transfer, a positive transfer from an association based upon differences in graphic forms and meanings and similarities in sound to economy in learning the correct spellings of words would not occur in most cases. An association between identical graphic forms, such as *ill, mill, will,* and so forth, and *fight, might, right,* and the like is more direct in nature and should show a greater transfer.

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[9] G. P. Mason, "Word Discrimination and Spelling," *Journal of Educational Research*, L (1957), 617-621.

[10] A. E. Watson, "Experimental Studies in the Psychology and Pedagogy of Spelling" (Contributions to Education, No. 638 [New York: Teachers College, Columbia University, 1935]), pp. 117-118.

Learning to write. There has been a great deal of study and much controversy around problems of teaching handwriting. The modern school looks upon reading and writing as ways of communicating with other people, as aspects of a language arts program in which children are taught many ways of communicating. The handwriting program of instruction has as its aim the development of legibility and speed of writing that are adequate for the ordinary needs of living. It should not be regarded as an isolated mechanical skill, in which the content and sequence are based solely upon the ease or difficulty of forming letters and words.

Handwriting as a sensorimotor skill involves muscular coordination. Thus, the development of writing skill will follow the same general course involved in the development of other sensorimotor skills. The muscular skills involved in good handwriting develop as result of maturation, practice, absence of pressure, and the elimination of incorrect habits of movements. One of the worst features found in guiding pupils in the development of writing skills is the emphasis frequently given to speed in writing. The abandonment of mechanical and meaningless drill was perhaps good, but the failure to provide a more useful method has been unfortunate. The acquisition of writing skill demands certain sound precepts applicable to the learning of other skills. Some of these are:

1. A reasonably good demonstration or model,
2. Practice under supervision,
3. Freedom from stress and pressure,
4. Guidance in self-diagnosis and self-appraisal of the skill,
5. Consideration of maturity,
6. Drill or intensive practice when needed.

Special problems. Two important factors that should be considered in the development of a handwriting program are (1) the needs of the children and (2) the difficulty of the writing tasks. The first of these factors takes into account the importance of needs and meaningful materials as motivating factors in learning, whereas the second factor is based upon the notion that the development of a skill follows a sequential pattern. Most studies appear to support the hypothesis that from the viewpoint of speed, quality, expression, spelling, and reading, manuscript writing should be taught in the first three grades, whereas cursive writing is superior after the third grade.[11]

In an analysis of 1,344,905 letters written by 2,381 persons, ranging in age from first-grade children to adults in various occupations, 42,284 specific illegibilities in handwriting were discovered.[12] The four letters *a*, *e*, *r*, and *t* contributed almost 50 per cent of the total number of disabilities. The frequency with which illegibilities appeared tended to decrease with age. The conclusions to be drawn from this and other studies of a kindred nature are that greater legibility in handwriting may be secured by: (1) teaching children to space their letters and arrange their words so as to avoid crowding; (2) giving careful attention to the formation of the seven small letters *r*, *n*, *e*, *a*, *d*, *o*, and *t*, and the capital letter *I*; and (3) special drill directed toward the removal of specific illegibilities.

Literature

Psychological considerations in the appreciation of literature. The vast amount and variety of available literature makes it difficult for parents, teachers, and consumers generally to select suitable materials. It is only natural that individuals should differ widely in their reading tastes. The individual's maturity, home background, intelligence, educational level, special abilities, interests, and the like have an important bearing on his reading likes and dislikes. Teachers should realize that literary appreciation is a personal matter and cannot be developed by force or under unpleasant circumstances. That appreciation is not developed through a structural analysis of the material being studied is almost axiomatic in learning. The student should first see each production as a *unified work.* Spending many weeks analyzing a literary production does not usually stimulate high-school boys and girls to seek out similar material for their own enjoyment and appreciation.

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[11] M. L. Little, "Current Opinion, Experimentation and Study on Handwriting Problems," *Elementary School Journal*, XLIII (1943), 607-611.

[12] T. E. Newland, "An Analytical Study of the Development of Illegibilities in Handwriting from the Lower Grades to Adulthood," *Journal of Educational Research*, XXVI (1932), 249-258.

Approaches to learning. The interests and needs of students enrolled in literature classes will show a wide range. Also, the methods of teaching that will prove most effective will vary from student to student as well as among different groups of students. The lack of interest in literature that so many students feel is often due, among other causes, to their teachers' approaches. J. N. Hook has emphasized the *multiple approach* to the teaching of literature.[13] This seems to have real merit; it is in harmony with concepts presented earlier in regard to motivation and learning, and provides for individual differences in interests and needs. The six approaches suggested by Hook are listed as follows: historical, socio-psychological, emotive, didactic (more or less moralistic), paraphrastic, and analytic.

Correlation of subject matter. Teachers of science often express a need to correlate work in science with that in other school subjects and with community life, but all too often fail to do anything about it. The learning of any subject is enhanced when it is related to other learnings. There are many writings in the field of literature that will stimulate other interests of the student. Through the use of metaphors, Maeterlinck's *The Intelligence of Flowers* provides concepts that may not be wholly scientific but which will furnish the stimulation so often needed for work in biology. The teacher of literature may feel that it is not his job to stimulate work in biology; however, correlating literature with the science that the students are now studying renders the place of literature in life more meaningful and increases its value. On the other hand, the teacher of science should realize that, although exactness is essential to the scientific method, he cannot develop an interest in scientific materials when emotions, feelings, and the creative spirit are completely eliminated.

Many poets have drawn heavily upon the materials of science. The teacher of literature should have a sufficient general educational background to guide and stimulate students as both producers and consumers of poetry and literature. He may, however, find it advisable to enlist the cooperation of the biology, physics, or chemistry teacher when he encounters certain problems with which he does not feel qualified to deal. This simply provides an increased opportunity for

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[13] J. N. Hook, "Multiple Approach in Teaching Literature," *English Journal*, XXXVII (1948), 182-192.

considering students' educational growth in a complete and unified manner rather than in segments.

Mathematics

Acquiring number concepts. Investigations by Mott traced the growth of number concepts in young children.[14] In a study in which the interview technique was applied to forty-four children between thirty-four and seventy-three months of age, it was found that 92 per cent had developed concepts for numbers from one to ten. The concepts developed by children who had attended a nursery school and kindergarten were superior in quality to those of children who had not had such school experiences. Mott and Martin interviewed sixty-six first-grade children, who had previously been tested at the end of their kindergarten period of schooling, to determine whether or not number concepts acquired in kindergarten are retained through the summer months.[15] Only in rote counting in the higher decades was any loss noted. This provided evidence that children, once they have developed certain number concepts, use them in their home and play environment and thus retain them. There is some evidence from this study (which has been substantiated by other studies and in the experience of qualified teachers) that readiness for number learning depends upon the experiences of the child as well as his degree of maturation.

Arithmetic learning. Our knowledge of the nature of learning leads to the conclusion that there must be order and sequence in the development of mathematical concepts. It has already been pointed out that a learning program in arithmetic must take into consideration the readiness of the learners. Arithmetic learning is systematic. This may be observed in the case of counting, addition, and multiplication. The elements of addition are based upon counting, and an understanding of multiplication would include a recognition of its relation to addition.

Experimental and control groups of children, aged ten years and three months upward, were used in a study by Middleton of the effects of systematic teaching of number combinations.[16] Each child in the experimental groups had daily practice using special systematically compiled sheets of number combinations, whereas the children in the control groups received regular practice for the same period daily in similar basic number combinations by methods usually adopted by the classroom teacher.

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[14] S. M. Mott, "Number Concepts of Small Children," *Mathematics Teacher*, XXXVIII (1945), 291-301.

[15] S. M. Mott and M. E. Martin, "Do First Graders Retain Number Concepts Learned in the Kindergarten?" *Mathematics Teacher*, XL (1947), 75-78.

[16] I. G. Middleton, "An Experimental Investigation into the Systematic Teach-

The experimental method "proved significantly superior in addition, multiplication, division, and mechanical arithmetic and there appears to have been some transfer to problem arithmetic. For the brighter children the value of the experimental method for subtraction is less marked." These results emphasize the extent to which children's ability in mathematics depends on a thorough grasp of the basic number combinations. Weak foundations, accompanied by errors, lead to poor achievements and to unfavorable attitudes toward mathematics as a school subject.

Activities involving numbers and number relations are useful in helping the pupil understand arithmetic not merely as a skill subject but also as a system of ideas. Functional problems encountered in classroom activities in nutrition, nature study, and in informal activities are useful. The use of concrete objects involving simple arithmetic problems will give meaning to addition and subtraction. Well-organized field work makes indirect measurements a reality, when the problems encountered are in harmony with the maturation and experiences of the children. There is a sequential order to the learning of arithmetic concepts.

Problem-solving in arithmetic. Considerable effort has been made toward the improvement of arithmetic problem-solving procedures. Some of the major causes of difficulty in problem-solving are: (1) mental immaturity or mental defects, (2) reading disabilities (especially with reading the arithmetic problems), (3) lack of experiences involving numerical relations, (4) insufficient experiences in solving simple arithmetic problems, (5) lack of skill in the fundamentals, (6) poor teaching, (7) carelessness, and (8) lack of motivation. Schaff has emphasized the desirability of a realistic approach to problem-solving in arithmetic.[17] Many of the suggestions offered aim toward a correction of the causes for the disabilities in arithmetic. The approach should include (1) an understanding of numbers and number relations, (2) understanding of mathematical relations as functions, such as

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ing of Number Combinations in Arithmetic," *British Journal of Educational Psychology*, XXVI (1956), 117-127.

[17] W. L. Schaff, "A Realistic Approach to Problem Solving in Arithmetic," *Elementary School Journal*, XLVI (1946), 494-497.

time, rate, distance, and so forth, (3) ability to visualize what is known and what is wanted, and to interpret questions, (4) an improved arithmetic vocabulary, (5) understanding of and ability to discriminate between relevant and irrelevant material, (6) analyzing the steps to be taken in the solution of the problem, (7) estimating the likely answer, and (8) checking the answer for correctness.

Although the meaningful approach is stressed, it is not to be inferred that the repetition of certain skills and concepts has no place. Once the child has grasped an understanding of the meaning of 2 times 5, it becomes important that this concept be made permanent. At this point, well-organized drills will function effectively. The most important factor causing low scores on problem-solving tests is computation difficulty, which usually accounts for more than 25 per cent of the incorrect answers. It has been observed that when pupils were given practice beforehand in the computations involved in the problem test, their scores on the test increased markedly. In algebraic problems, the elimination of difficulties involving fundamentals, arithmetic combinations, squaring, and factoring the unknown quantities will considerably reduce the difficulties present in the problem situation. These computation factors are part of the total problem situation, and the difficulty of thinking through a problem is reinforced by any specific difficulty present in the computation process.

Learning as reorganization. Most of the learning that we experience consists of a continuous reorganization of past experiences rather than a logical process whereby new experiences are added to past experiences. If one accepts this concept, certain fundamental implications should be recognized. These have been listed by Burch as follows:

> (1) The learning of any concept or procedure is a long time process. For instance, the first grade teacher must begin to develop the ideas of division and each teacher in the succeeding grades must guide the reorganization of the child's ideas so that he will be ready for division as a symbolic process at the fourth or fifth grade level. (2) In remedial work it is essential to find out how the child is thinking and not to be always concerned only with whether or not the child is getting the right answer. (3) Frequently when the child's rate and accuracy seem to have fallen off, the root of the difficulty may lie in the fact that the child is operating on a higher level of mental thought than previously. Due to the fact that he is adjusting to this new mode of attack, he is not sure of himself. Yet, from the viewpoint of future achievement in arithmetic, his reorganized attack represents definite growth. (4) If we accept as basic this theory of learning as reorganization, the errors a child makes in the learning process must not be judged as serious as they

> first appear, for the errors as such present to the child another opportunity for a learning situation.[18]

An important study bearing on this theory was conducted with third-grade pupils by Brownell, Kuehner, and Rein.[19] Special emphasis was given to the concept that learning involves a reorganization of experiences. One of the problems studied concerned the use of crutches in exercises involving subtraction. The question raised was the desirability of permitting a child to insert a written notation as follows:

$$\begin{array}{r} 31 \\ 45 \\ -17 \\ \hline 28 \end{array}$$

The use of crutches has been seriously criticized by some students as a way of establishing undesirable habits. This study showed, however, that the insertion of numbers such as those illustrated in the subtraction exercise was helpful to the child in the learning process. Furthermore, these habits are discarded at a later stage in the child's educational growth and development.

Learning difficulties in algebra. There are two ways of developing meanings in the teaching of algebra. The first involves stating a rule or principle and then illustrating the rule by a number of typical examples. The assumption here is that a statement is to be made, then meanings are to be built up from the statement. Unfortunately, pupils rarely return to the rule or principle after reading the illustrations; they go directly on to the problems and attempt to work them by the same methods used in the illustration. Therefore, the general concept is never completely clarified.

Meanings are learned in actual situations in algebra as elsewhere in life. Rules and principles should grow out of actual experiences. Since the pupils' experiences from which meanings in algebra may be secured are limited, it is necessary to supply meanings for them. The notion of a function is one that should arise out of the pupil's study of equations and formulas. *The concept of a function is easily developed in practical situations; what pupils need is experience in dealing with situations involving the idea rather than lengthy verbal statements that in themselves need explanation.*

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[18] R. L. Burch, "Skills Instruction in Arithmetic," *Bulletin of the Department of Elementary School of Principals,* XXIX (1949), 28.

[19] W. A. Brownell, *et al.,* "An Experiment on Borrowing in Third Grade Arithmetic," *Journal of Educational Research,* XLI (1947), 161-171.

Readiness has too often been conceived of in connection with the primary-school child's readiness for reading, computation, spelling, and the like. Opportune timing is important in all subjects—it is particularly important in algebra and geometry. Fulkerson has analyzed the stages involved in teaching an equation in algebra.[20] In this connection, he emphasizes the value of the student's having developed certain meanings and interpretations before he attempts to understand and perform operations involving equations.

Mental processes in learning geometry. The solution of geometry problems is not different from other types of problem-solving activities. However, the lack of correlation of such problems with life situations at school or in the home has made this course abstract and meaningless to a majority of students. Schunert noted that boys excelled girls in geometry achievement.[21]

A splendid opportunity to use meaningful problems is afforded by interrelating geometry with the practical arts, physics, specific situations on the athletic field, and the like. Problems in geometry should be *genuine* and *realistic*. They will then yield to a treatment in which the principles of association and unity in learning are used to a large degree. Some of the mental processes involved in studying geometry may be stated in the following manner:

1. Securing a clear notion of what is to be done;
2. Conceiving the figure that is to be used;
3. Determining just what is to be done to the figure, what feature is to be used, and what additional lines are to be drawn, so as to recall memories and facilitate logical thinking;
4. Grasping all the essential elements that lead to a conclusion;
5. Arranging the essential elements in logical sequence.

The lack of a method of attack is an important cause of failures in problem-solving in geometry. Most students will need some selective direction in the organization of their attack upon a problem situation. The dull pupil will profit most from such direction. Wherever possible, graphs should be used in problem-solving activities, for they enable pupils to perceive existing relationships better. Graphs and other supplementary devices make geometry materials more vital and meaningful. Achievement in algebra and geometry is enhanced by frequent reviews, differentiated assignments, and the application of principles to life situations.

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[20] E. Fulkerson, "Teaching Equations in First Year Algebra," *School Science and Mathematics,* XLVIII (1948), 705-711.

[21] J. R. Schunert, "The Association of Mathematical Achievement with Certain Factors Resident in the Teacher, in the Teaching, in the Pupil, and in the School," *Journal of Experimental Education,* XI~~X~~ (1951), 219-238.

The fine arts

The elementary schools have been more successful in teaching the arts than have the secondary schools. Elementary-school teachers, because of the nature and procedures of their programs, are able to construct more integrated programs. Then, too, elementary teachers are more committed in their practices to methods that place emphasis on the individual child. A few, however, have confused creativeness with freedom of action. It should be pointed out in relation to the arts that creative work must be motivated and directed. Pupils become creative when they discover new meanings and new relationships in tone, form, or color. On the basis of these meanings and relationships, they devise and formulate their plans of action.

Forcing techniques upon a child before he is mature enough to perform can only result in failure and the establishment of a barrier to further development. Concerning this, Swenson has stated:

> . . . Making the child afraid to try an original painting by insisting that it be as good as the pattern or ridiculing a naive childish comment in the interpretation of a poem are not only crushing blows to the child's personality but also stone-wall barriers to further aesthetic expression and development. Aesthetic production, reproduction, and enjoyment demand freedom of response. We must help children keep the free spontaneity of early childhood if their aesthetic experiences are to be stepping stones to further growth.[22]

Art education. The last two decades have witnessed important changes in the goals and methods of art instruction. No longer is the teacher's major concern with techniques or the development of an artist with the ability to sketch a beautiful landscape. The concern has been shifted to the development, enrichment, and self-expression of the individual learner. Thus, art experience is planned for the purpose of stimulating individual growth and development. Such a viewpoint envisions art as a natural medium of expression for all children rather than for a few talented individuals.

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[22] E. J. Swenson, "Applications of Learning Principles to the Improvement of Teaching in the Early Elementary Grades," Forty-ninth Yearbook of the National Society for the Study of Education (Chicago: University of Chicago Press, 1950), p. 270. Quoted by permission of the Society.

Such a program requires methods that will motivate all of the pupils. The resources of the community as well as the school are enlisted as a means of developing a more vital and meaningful program. The importance of the child, his emotional needs, yearnings, ideas, interests, and creative abilities are the concern of the teacher. Art as a stereotype program stifles individual development; art when rid of these stereotypes liberates the potentials of the individual and furnishes a wider horizon for growth. Some questions with which the teacher of art is concerned are: To what extent can art experiences be planned around the current interests of the children? What kinds of art experiences are of most value to the group and to the individual members of the group? How can the pupil be motivated to further self-direction to the end that such experiences will be worth-while to him?

An answer to the first question will require of the teacher an understanding of the interests and needs of children at different age levels. Materials bearing on the interests of children were presented in Chapter 12. Loomer has pointed out in this connection that, "Because of the diversity and individuality of experience, there is no one appealing type of subject matter. Interests are as varied and numerous as the number of students in the class, so that offerings must be individualized to give purpose, stimulate effort, and give meaning to the content."[23] If the art experiences are to be tied to contemporary life activities, the activities at school must not be limited to the classroom. It is at this point that excursions, field trips, and home and community experiences make the art program more meaningful and more functional.

Music education. The beginning of music instruction is based upon rote songs. As was discussed in an earlier chapter, introductory songs should be in harmony with the voices of the children. Teaching the children to sing simple songs in unison should be the beginning stage of music instruction, and should continue to be a large part of the music program. However, at a later stage (usually around the third grade), music reading may be added. This work should not be too formal in nature, but should be introduced in music games, and in connection with songs that they have already learned to sing in unison. Some types of songs for children that have been suggested are: festival songs, Mother Goose songs, lullabies, songs about animals and birds, songs of outdoor activities, Christmas carols, hymns and songs about other children. Singing is an activity by means of which the child can fulfill his desire or need for self-expression.

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[23] G. C. Loomer, "A Study of Certain Effects of Three Types of Learning Experiences in Art as Revealed in the Drawings by Participants," *Journal of Experimental Education*, XXII (1953), 65-102.

Besides singing, many schools are making good use of radio programs and the phonograph as means for developing appreciation of rhythm and music. Rhythm bands, dancing and skipping to music, and special school programs provide means for teaching and motivating the work in music. There is little systematic knowledge as to just when the average child is ready to learn "sight reading" or to play a musical instrument. That type of readiness will be influenced by such factors as intelligence, musical aptitude, and musical background. Individual differences exist, but they are probably no greater here than in other areas of education. However, specialized training during the preschool and kindergarten stages in the technical skills involved in music will yield very small returns for the average child. A minimum amount of auditory-manual training, in which games are used to stimulate interest, may be of value in the development of an interest in instrumental music and create a deeper appreciation for it.

The goal of music training should be the development of increased sensitivity to good music and a greater appreciation and understanding of different kinds of music, rather than making finished producers of music. Many opinions have been given by music educators as to the value of instrumental music training as a method of teaching music to grade children. Although many children have had some instrumental music experience, it is generally not regarded as essential or even important for all children to have such an experience. A study reported by Nelson was undertaken to determine the relative value of a music course, including vocal and instrumental participation by the pupils, as compared to one including only vocal instruction.[24] The study was conducted with controlled and experimental groups of fourth- and fifth-grade pupils as subjects.

The fifth-grade experimental group attained significantly higher scores on the musical tests used for evaluating growth and learning than did the control group. The differences in the fourth grades were not as great. These findings suggest that a combined vocal-instrumental curriculum introduced at the fifth-grade level may have a beneficial effect upon the child's development of music appreciation as well as upon his musical knowledge and skill. Too early an introduction of such a procedure may have a detrimental effect upon such learnings.

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[24] C. B. Nelson, "An Experimental Evaluation of Two Methods of Teaching Music in the Fourth and Fifth Grades," *Journal of Experimental Education,* XXIII (1954-55), 231-238.

Creativity in expression. An important function of English is to help the student to develop his capacity for translating experiences into words. This ability to write and speak so as to express one's thoughts and feelings has been referred to as *creative English,* and is definitely related to the creativeness found in art and music. The importance of experience in relation to creative thinking was discussed in Chapter 19. The concepts presented there in relation to creative thinking are all applicable to the development of creative English. The student should experience richly and deeply; he should obtain stimulation and meanings from his experiences. The teacher should guide him as he draws upon these experiences and shares their meanings with others through suitable forms of expression. Many of these experiences may seem trivial to the teacher, but their significance in the life of the student is the basis for their value in creative expression. The teacher of English should therefore guide the student in the development of materials drawn from activities and situations with which he has been intimately associated. His enthusiasms, joys, sorrows, frustrations, beliefs, and commonplace activities become more meaningful to him as he is guided in translating them into words. Such experiences then enhance the individual's feelings of personal worth. Life is given added value and richer meaning when the experiences that compose it are reorganized and translated into words.

Practical arts

An outstanding development in education after World War I was an increased interest in the practical arts, not only for work and making a living but also for recreation and living. A recognition of the technical changes occurring in our society became widespread during the depression years of the 1930's. The changed nature of our society became still more conspicuous during the Second World War, so that educational planning during the postwar period has been devoting further attention to the practical arts. Thus, training the masses to live in a technical society appears necessary from the standpoint of the consumer as well as that of the producer. London and Hostetler concluded from their study of the postwar planning of industrial-vocational education that our changed society requires more technical training for occupations above the skilled-labor grades and below the engineering level.[25] Growing boys and girls require a broad basic training in the major industrial areas instead of training in one specific skill.

There is a growing recognition that industrial arts is of value to girls as well as boys. Needless to say the nature of the learning experiences should be selected to meet the needs of boys and girls at different age levels. The learning experiences in this field should be closely correlated with some of those found in the fine arts. Some units of work in the elementary grades that would involve a correlation of painting, music, and industrial arts include *The Play House*, *The Circus*, and *Transportation*.

Industrial arts. Most children and adults enjoy manipulating and testing material objects, creating artistic things, and sharing interests and activities with others. Because of this, the problem of motivating work in the arts should be much easier than it is in many other divisions of the school program. But the formal organization of arts programs around materials of little interest to pupils has often made the work meaningless and the courses unpopular. However, there is a noticeable trend toward the development of functional programs from the first grade through the secondary school. Such a program, particularly for the practical arts, is based upon the belief that practical experiences may provide a valuable part of a child's education. Concerning this general problem Studebaker has stated:

> Today we realize that the separation of education from work is unfortunate, first because instruction without application becomes academic and formal, and second because work without thought and study becomes drudgery.[26]

The development of skills in the industrial arts will depend upon a number of factors, among which are: (1) the child's maturity, (2) the motivation of the child, (3) the organization of the units of work, (4) the materials available for use, and (5) the nature of the instruction. Since the development of skills *as such* is not the primary aim of the work, especially in the earlier years, attention will be given to some conditions that will enhance the general educational outcomes.

In the first place, industrial art activities in the elementary grades should be interrelated with other phases of the school program. They should be closely correlated with work in the fine arts. Good design should be carried over in the making of a baby crib or a home for a pet rabbit. If the broader objectives of industrial arts are to be realized, the pupils should plan their own projects, under the guidance of the grade teacher, and these projects should grow out of materials in the units of work being studied at the time, and thus supplement them. Tools and procedures should be carefully chosen with regard to their functional use and the maturity and background of the pupils.

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[25] H. H. London and I. Hostetler, "Guiding Principles in Planning Postwar Programs in Industrial Education," *American School Board Journal*, CXII (1946), 33-34.

[26] J. W. Studebaker, "Editorial Comment," *The Phi Delta Kappan*, XIX (1937), 298.

Demonstrations are valuable devices in the introduction of new materials and new techniques. On the secondary-school level, visual aid materials may be most helpful. However, the value of such devices will depend upon the extent to which the teacher prepares the pupils for them. Along with the demonstrations, the teacher should point out why certain techniques are considered better than others. If a pupil understands how a square should be handled and why, he will form a correct habit that will carry over and function in the handling of related materials to a much greater extent. The work should be organized in such a way as to proceed from simpler materials and problems to more complex ones. The problems, however, should always be kept within the scope of the pupil's experiences and interests. The use of simple hand tools should precede the use of power tools. Making a shelf should precede making a magazine rack. Outcomes may be considerably enhanced by a good program of supplementary reading related to the materials being used, the designs being developed, and the functional value of the finished materials. To be complete, the work in the class and shop should be supplemented by visits to industries, excursions, and the like.

Home economics. Most of what has been said about the values to be gained, the methods of instruction, and the motivation of work in the industrial arts can be applied to home economics. Especially pertinent to the work in home economics during the junior-high-school period is the fact that, given a broad interpretation, it is valuable for boys as well as for girls.

The sciences

The world as understood by man is not composed of discrete groups of unrelated and dissimilar phenomena. On the contrary, *there is a oneness, a unity*, in all nature. Only arbitrary divisions can be made;

related problems may then be grouped together as one body of knowledge. The interests of the individual pupil, the methods of study used, and the types of phenomena studied, as well as other factors, account for our present organization of scientific knowledge under the names *chemistry*, *physics*, *geology*, *zoology*, *botany*, and so on. However, when the teacher loses sight of the student in an effort to organize science materials under neat categories, learning becomes less effective and the student's interest in science fails to develop. Miller and Dresden report a study in which one day a week was devoted to topics that made use of current materials.[27] The results from this procedure were compared with those obtained from a control group in which no period was set aside for current materials. No significant differences were found in the outcomes on standardized tests. On information tests based on current problems, however, the experimental classes were superior. There was also considerable evidence of greater pupil and teacher interest as well as increased pupil participation in the experimental group. A follow-up study of these groups has shown that interest developed in current science materials tends to persist after pupils leave high school.

Language difficulties in science. The most obvious characteristic of science information, concepts, and generalizations is that they are in large measure verbal. This presents a major learning difficulty for many pupils. In the first place, many pupils who enter high school have never developed good reading skills. Some possess no more ability in reading than the average fifth- or sixth-grade pupil. Not only do many pupils read poorly in general; some are able to comprehend one type of reading material but unable to comprehend another type with any degree of success. There are many different types of reading, and reading is done for a large number of purposes. As long as the schools depend so completely upon reading for the acquisition of new information and the enlargement of concepts, reading disabilities of various kinds will present a major barrier to the learning of science materials.

The second language difficulty is related to this problem of reading deficiency. Pupils not only do not secure training in the elementary grades that leads to effective reading in and studying of science, but much of their training is of a directly opposite sort. The predominant aim of elementary teachers in reading, after the mechanics of reading are acquired, is usually literary and appreciative, whereas the function of reading in high school should be primarily to secure information and acquire attitudes. The study of science materials requires critical thinking on specific problems, followed by generalizations to related problems. Language deficiencies present a definite barrier to critical thinking.

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[27] M. M. Miller and K. Dresden, "Current Approaches in the Teaching of Science," *School Science and Mathematics*, XLIX (1949), 359-365.

In the earlier stages of science experiences, meanings are perceived on the perceptual level. Later, when relationships and materials can be denoted by symbols, these are frequently substituted for the more concrete things or for the processes for which they stand. Thus, these symbols may be used for the development of meanings. The effectiveness of science teaching and learning depends largely on the meanings developed and the facility of the pupil for thinking about and expressing these meanings. This fact makes it important that teachers consider the development of adequate methods and vehicles for thought and expression. Ability to think in terms of words and other symbols is very closely related to the ability to learn science. Abstraction and generalization depend upon the ability to associate meanings with words, and to use words in thinking, instead of the objects and relationships they represent.

Science learning. The development of ideas about the environment has advanced to a marked degree by the time the child enters school, although he may not be able to verbalize all his knowledge and understanding about the physical universe. Children seek answers to questions about the forces and materials of the physical universe that have important bearings on their own lives. The interpretation that the child gives to his physical environment has an important bearing on his total growth. If he is induced to accept misconceptions, superstitions, and dogmatic beliefs, his outlook upon life and the world in which he lives will affect his total development. However, a teacher must be careful so as not to retard or block the reflective thinking of the child while trying to correct false ideas or misconceptions. The child should feel free to express his ideas even though they are incorrect and should be given assistance in gathering information that will correct such ideas.

Another fundamental in the learning of science is to begin with the experiences of the children. It has already been pointed out that children enter school with considerable knowledge about their environment. They bring six years of experience with them in school. The lessons in science must be in harmony with these experiences. Artificial motivation will not be necessary to enlist children's interest in science if the teacher will relate the materials to the experiences of the pupils. Often young children are challenged by ideas that appear commonplace or even dull to the adult. It is only when the teacher is able to view the universe from the learner's point of view, as well as his own, that he is able to enlist the interest and best efforts of the pupils.

The selection and direction of experiences will determine the nature and extent of the learning outcomes. A collection of unrelated and meaningless experiences will result in little pupil growth. Experimenting, when carefully planned and directed, is a valuable means for children to acquire the beginning of scientific methods and principles. Such experiments should be kept simple. Experiments beyond the child's comprehension ability, conducted with expensive and complicated apparatus, have very little value in the elementary science program.

At the high-school level, carefully directed study is very important, Directed study should relate both to supplementary reading materials in the library and to work in the laboratory. There is evidence that laboratory work may be meaningless and largely a waste of time unless it is conducted so as to aid students in finding answers to problems. Unless he knows what it is to which he is trying to find an answer—unless he has a problem—the "answer" is likely to be meaningless to the student. Closely related to a clear understanding of the nature of the problem is the method of procedure. The results obtained from an analysis of fifty-two studies comparing the value of the laboratory method and the lecture-demonstration method in teaching science have been summarized by Cunningham.[28] These results are by no means in complete agreement. It appears, however, that when the exercises are long and complicated the lecture-demonstration procedure offers the best method; when the exercises are short and the student checks and evaluates his progress, the laboratory method may be used to a good advantage.

Learning in biology. Like other sciences, biology presents a number of difficulties to the student and teacher. The language difficulties in the sciences have already been discussed. The biology course will introduce many new and technical words; if the teacher follows a strictly textbook approach, he may find himself teaching materials accessible to the daily observation of the pupils but without the pupils ever recognizing them. Students from rural areas have had many experiences with animal and plant life, and these experiences should be used as the basis for the learning of biology materials. Rapid industrialization since the turn of the century has, however, produced a different life background for most students from that which existed when most people lived a rural life and the horse and buggy were familiar means of transportation to everyone. However, the interest in flower gardens, the renewed interest in small vegetable gardens where facilities will permit, and the drift of our population into suburban areas of the cities are factors that may aid in providing experiences for understanding and organizing ideas in biology. If early work in biology takes into consideration the environment in which the pupils live and is not too highly organized around microscopic organisms and the like, it will be more meaningful and useful. Difficulties in learning, then, often result from the failure to make use of as yet unorganized ideas already existing.

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[28] H. A. Cunningham, "Lecture Demonstration versus Individual Laboratory Method in Science Teaching—A Summary," *Science Education* XXX (1946), 70-82.

Questions have been raised concerning the laboratory and lecture-demonstration method, unit and textbook assignments, and ready-made and reproduced drawings, as well as problems dealing with reviews, drills, recitations, and lecture procedures for teaching biology. The answers to these questions will be determined in large measure by the materials available for conducting the work, the organization of the course, and other elements of the school program. However, the following principles are fundamental in any program of work in biology:

1. The biology should be organized so as to include problems for study and experimentation.
2. The work should be supplemented with actual problems taken from the local community; such problems should be selected by the pupils under the teacher's direction and guidance.
3. Wide experience in problem-solving should be provided. Students should be guided in attacking problems so as to develop better habits of reflective thinking.
4. The work should be correlated with other phases of the school program.

Learning in physics. The materials and methods involved in learning physics have changed considerably during the past quarter of a century. The introduction of outstanding developments in radio, talking pictures, photo electric cells, electrical appliances, and methods of travel, as well as in many other devices related to present-day living, has produced an enormous demand for applied physics, with a greater emphasis upon the concrete rather than the abstract, upon the use of things rather than symbols, and upon the *qualitative* rather than the exclusively *quantitative* treatment of problems. The atomic and nuclear age has brought forth new horizons to the student of science, particularly physics. This has engendered a need for teachers of science to study further problems involved in these new developments. Also, the modern space age has produced increased demands for science teachers with broad understandings.

The principles of learning set forth for biology are also applicable to studying physics. On the basis of experimental results comparing the conventional laboratory method with the demonstration method for teaching physics, it has been suggested that instructional practices be modified for certain nontechnical curricula.[29] If the objective is an understanding of the elementary principles as measured by paper-and-pencil tests, a demonstration-laboratory procedure is as satisfactory as the conventional. It is quite conceivable that for certain types of learning one method is superior whereas for other types of learning the other method is superior. Thus, a combination of the two methods might be preferable. The results of a study by Lahti [30] indicates that the individualized inductive-deductive laboratory procedure offers an effective means for developing the student's ability to use the scientific method.

Problems in learning chemistry. The learning of chemistry—to an even greater extent than the learning of physics—depends on symbols. One important problem relates to the acquisition of meanings for symbols used to express chemical facts and processes. Such meanings are acquired either through actual contact with processes in the laboratory or through reading about them. It takes considerable skill on the part of the teacher to coordinate these two methods of acquiring meanings. In the laboratory, actual things are observed and knowledge is gained at first hand. Meanings are acquired from a language context simply because the language already carries certain meanings. The new is, thus, described in terms of the old, which in many cases in science is inaccurate.

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[29] H. Kruglah, "A Comparison of the Conventional and Demonstration Methods in the Elementary College Physics Laboratory," *Journal of Experimental Education*, XX (1952), 293-300.

[30] A. M. Lahti, "The Inductive-Deductive Method and the Physical Science Laboratory," *Journal of Experimental Education*, XXIV (1956), 149-163.

If we assume that the mastery of symbols is essential for progress in chemistry, then that mastery becomes one of the problems of teaching and learning chemistry. From what we know about vocabulary growth, we are safe in assuming that experiences with concrete materials are essential in the development of symbolism. The individual must be instructed in such a way that he is not suddenly thrust into the abstract. Most fundamental concepts of chemistry are given to the student in terms of lengthy verbal descriptions necessary for their understanding and symbols that may be used to stand for these descriptions. Gradually, the student abbreviates his lengthy verbal reactions in thinking to more direct ones through the use of the symbols. Most of the difficulty experienced with symbols arises from the fact that not enough time has been devoted to developing their meanings.

If the student learns early that chemistry is a study of the changes in the substances of things, and that these changes occur according to certain fundamental laws and principles, he is on the right track for the development of good study habits. Chemistry may be one of the most easily motivated subjects, since its applications can be readily seen by students if the materials are presented in a functional and related manner. Again, its exactness makes accurate checking on the part of the teacher and pupil, for the purpose of evaluating progress and revealing difficulties, easy.

The two factors responsible for most errors of high-school students in chemistry are: (1) insufficient drill (thus, failure to provide for the overlearning of the fundamentals), and (2) a lack of organization of materials into meaningful patterns. The science materials in chemistry are organized around verbal units, many of which are simply isolated word formulas unrelated to other experiences. Sometimes certain formulas or definitions may be fundamental to the development of larger or more complex units of learning; but if they are to have meaning, be retained, and transferred to larger related problems, they must be grasped and understood in connection with patterns of ideas and concepts that are already present. It is in this connection that learning becomes a matter of reorganizing ideas and notions developed through earlier experiences. It may be necessary to drill these smaller units later on; but such drill is well-nigh worthless, as an educational enterprise, if it is not preceded by learning materials based upon the fundamental laws of learning and association presented in preceding chapters.

Social science

Technological developments, the growth of cities, more widespread communication and travel, and the increased importance of organized groups have led to important changes in the social science program. The role of pupil participation has been emphasized by social science teachers, sometimes to the extent that little individual effort was used in studying and solving social problems. The acquisition of social science concepts and the development of problem-solving ability in the area of social studies follows the fundamental principles set forth in earlier chapters.

Concepts grow from experience. Many pupils have not been prepared by their experiences to understand the social science problems and reading materials that they encounter. Children possess a great deal of information about the *social world*, but much of it is entangled with misconceptions. Children readily grasp this concept as a whole, but confusion enters into particular meanings, especially into meanings that involve personal relations. Studies show that many of these misconceptions persist into the college years. Social concepts differ from science concepts in that one introduces his own philosophy into the interpretations given to social causation. Thus, an inadequate fund of experiences or certain unusual experiences may furnish the setting for faulty interpretations. A total lack of experience with social studies materials will reduce the concepts presented to almost meaningless verbalisms. It is not essential, however, for the pupil to have had experiences identical with those in the unit of subject matter he is studying. None of us has had the experiences of the Crusaders, but we have all had experiences containing enough elements in common with those of the Crusaders to enable us to understand and appreciate their motives and activities.

It is possible for the teacher to provide personal experiences by introducing a large amount of concrete and local material. In almost any community will be found persons, objects, or places that are connected with past events. Local names, the names of families, villages, mountains, and streams, are frequently associated with interesting and worth-while historical events. It has been truthfully stated that "every community has a history." There is a wealth of material in almost any community that can be used effectively in motivating social science work. A knowledge of how the people (Indians or early settlers, in the case of America) that formerly lived in a particular community responded to their environment, and of the social, political, and economic conditions that affected their lives can well be secured by studying the early settlement of that community.

The development of social science concepts. Teachers need to understand the educational significance of the formation of social concepts. Their growth and qualitative characteristics at different age levels must be studied. In this connection, the principle of continuity should be emphasized in learning. The child interprets and deals with new situations at school in terms of his previous learning in the non-school environment as well as the school environment. In a study by Lacey, 125 common social studies concepts and 315 meanings associated with them were used in order to arrive at a better understanding of concept formation among children in the elementary grades.[31] The results of the study revealed a continuous development of these concepts, with the percentage of correct responses steadily increasing from grade to grade. The difference between grades one and two was not very great, although there were pronounced individual differences within each grade.

An adequate sense of time and space is important for the development of larger and fuller social science concepts. Social actualities have both a time and place reference; these references are not only necessary in understanding and remembering actualities, but become essential parts of them. It has been found that conventional names of time periods have little meaning for children younger than eleven years of age unless they are definitely explained and correlated with the children's general activities. Studies show that there is a continuous and steady growth of time concepts from grade to grade. Such a growth is very closely related to mental age or growth toward mental maturity. Until the child has developed enough mental maturity to enable him to grasp the concept of time, he cannot possibly develop a sense of historical sequence, upon which the study of history depends. Being capable of remembering facts relating to a distant past bears little relation to the development of this time concept. Travel is especially important in arriving at a fuller conception of space. A knowledge of the distance, area, quantity, and similar properties of a few familiar social situations is important as a basis with which to compare other social actualities. After examining 1,300 elementary-school children, Howe found that: (1) children do not acquire a knowledge of directions until they study geography; (2) more than half of the pupils knew the directions, but many errors were made; (3) their sense of direction is often associated with some local object rather than with natural phenomena; and (4) boys appear to know directions better than girls. On the basis of these findings he has contended that more drill work relative to space and directions is needed.[32]

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[31] J. M. Lacey, "Social Studies Concepts of Children in the First Three Grades," (Contributors to Education, No. 548 [New York: Teachers College, Columbia University, 1932]).

Investigations show that there is also a steady growth in children's social concepts from grade to grade. The child's first perceptions are characterized as simple, concrete, and undifferentiated. Particulars become individualized as a result of experiences with these undifferentiated meanings. For example, the concept of *democracy* develops into a particular through varied experiences with materials involving the operation of democratic procedures. These will involve experiences on the playground as well as in the classroom. Experiences involving decisions and actions arrived at through the will of the majority tend to give meaning and vitality to the concept underlying the symbol *democracy*. Civic, governmental, political, and other concepts are also developed through the organization of learning units that are at first largely undifferentiated.

Social studies learning. The grade level at which different geographic facts and concepts are taught will depend to a large extent on the geography or social studies curriculum for a particular school. However, it is reasonable to expect that all geographic concepts and skills need to be reinforced and sometimes retaught from grade to grade. A geophysical relief globe has been found useful in various phases of social science; it will be helpful to the teacher in introducing new ideas, reviewing concepts and skills already developed, and in reinforcing other learnings at all grade levels.

Concept-building in the social studies is based upon the ability of the textbook and teacher to make both the people and the place in which they live, or lived, seem real to the pupils. Movies, dramatizations, and television may be used effectively in this connection. Correct concepts in globe and map reading should not be overlooked. The teacher must guide the pupils in correctly interpreting materials shown on globes and maps. They must see the ocean as blue on the maps, the rivers as irregular lines running through the land areas, and the mountains as darker brown areas. After the pupils have learned to read meaning into a map, an enlarged aerial photo of the community may be studied. Pupils are particularly interested in locating familiar points—points where they have lived or visited. Once children have learned to read meaning into maps, the teacher should guide them in getting meaning out of maps—interpretation of map symbols, translating dots and other symbols into meaningful signs. This interpretation is an important means of furthering learning and educational growth.

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[32] G. F. Howe, "A Study of the Ability of Elementary School Pupils to Read Maps," Thirty-second Yearbook of the National Society for the Study of Education (Bloomington, Ill.: Public School Publishing Company, 1933), 486-492.

Next to the object itself, the picture of the object is most useful in the development of an understanding of the object. Certainly pictures, motion pictures, and television are useful devices for giving the pupil a more accurate impression of the thing being studied. These not only provide a more accurate impression; they also stimulate the child's interest so that his attention is better directed toward the object. There has been considerable attention given to the effect of television in the home on school achievement. The results of studies on this problem are not in agreement, indicating that the nature and amount of watching television may be the determining factor. With a reasonable amount of guidance for the pupil, television may become an important educational source to supplement or correlate with the school curriculum.

Summary

The materials of the school curriculum should increase in variety and complexity in accordance with the mental level of the pupils. Furthermore, learning, from the beginning, should be organized in terms of the child's experience and should be evaluated in terms of its contribution to the development of the individual personality. It is important for those concerned with child training to remember that a child's intellect is related to his physical well-being; his health is affected by his emotional state; and his emotions are influenced by his school success, his physical health, and his intellectual and social adequacy. By means of these, a child reacts as a *total being*.

The problems of learning in the content subjects, although not identical, do present certain significant items in common. Some of these are: (1) the importance of the child's experiences, (2) the need for motivation or drive for efficiency in learning, (3) the necessity of fixating certain habits through some sort of drill activities, (4) the importance of *units* in learning; that is, of understanding materials in relation to a larger whole (pattern learning), (5) the necessity of pupil activity in learning, and (6) the need for guidance in the learning process.

The increased interest in social understanding, appreciation of beauty and symmetry, self-discipline, creative and critical thinking, and the development of healthy and wholesome attitudes demands new insights and changed methods on the part of teachers. These are aspects of learning at school and are subject to the laws and principles of learning described in earlier chapters. The emphasis on factual learning *per se* is insufficient. There is not much transfer from the learning of the routine facts of history, the names and works of great artists, or the formulas of science, to such things as social understanding, art appreciation, or a scientific attitude.

QUESTIONS AND EXERCISES

for discussion and study

1. If the inductive approach to the teaching of correct expression is to be followed, when would you suggest that principles of grammar be studied?
2. What does the "organic theory of learning" a modern language mean? Could this idea or theory be applied to learning social studies materials?
3. How does reading so much nonfactual material in the elementary grades bear on the difficulty involved in teaching and learning science in later grades?
4. What are some effects that recent developments in atomic energy and space travel will likely have on the school program in science? In social science?
5. Give an illustration to show that science materials are interrelated. What do you consider from your observations and reading to be the greatest barrier to a well-developed and unified program in science in most schools?
6. Show how the community can be made the laboratory for work in the social studies. How can the social studies be organized and taught so as to promote social understanding and habits of cooperation? What difficulties are encountered in administering such a program?

7 What are the advantages of teaching tool operations in terms of meaning rather than manipulation?

8 What is wrong with teaching problem-solving in terms of fixed habits? How may this affect learning?

9 Since some physics information is possessed by the pupil when he enters the physics class, what are the chief problems in learning physics? How is chemistry different from this? Is the world one of law and order, cause and effect, or one of chance and fate, according to the concepts of the average adolescent?

10 What are some motivating devices used by high-school teachers to get students to prepare their assignments? Evaluate these in terms of the notions about motivation presented in Chapter 16.

11 Can you suggest literary selections that could well be correlated with the science, the social science, or one of the vocational subjects of the school curriculum? How does this approach enhance the teaching of literature and literary appreciation?

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CHAPTER 21

Subject disabilities: special difficulties in school learning

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The problem of disabilities

DISABILITY HAS BEEN DEFINED as "a structural impairment of some organ or member of the body, which results in impairment of certain functions."[1] It is obvious that Warren had in mind the physically and mentally handicapped, whose disability is due to defective vision, impaired hearing, brain damage, endocrinal disorders, and the like. Warren's clear-cut statement includes but one class of disabilities—those due to structural impairment. The teacher encounters other kinds of disabilities, however, namely, subject disabilities or special learning disabilities. For example, some children are mirror writers, some have marked disabilities in reading, arithmetic, spelling, or music, and so on. It is with school learning disabilities that this chapter deals.

Prevalence of disabilities. We do not exaggerate when we say that many children have a handicap or disability of one kind or another. Since these handicaps exist in all degrees of seriousness, the data that we have do not tell the whole story. The number of subject or grade repeaters in the schools and the number of drop-outs from school are frequently due to subject disabilities and their complications. Many disability cases remain in school and many pupils discontinue their schooling for other reasons. From 20 to 40 per cent of the two million children who enter the first grade in September will fail in reading by the end of the school year. These children are either required to repeat the work or are promoted, although they are inadequately prepared for reading on the second-grade level. When we consider that from a third to a half of the time spent in the first grade is devoted to reading and other language arts, and that as many as 20 per cent of *all* subject failures from the first grade to the university are traceable to an inability to read at the expected level, we can see how tragic the situation is for these children. It is tragic because so many failures could have been prevented.

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[1] H. C. Warren, *Dictionary of Psychology* (Boston: Houghton Mifflin Company, 1934).

Some research findings

New York City third grade.[2] Of 6,581 third-grade pupils in New York City, 12 per cent did as well as, or better than, pupils in the fifth grade in reading, whereas 12 per cent did worse than children in grade 2B. The Stanford Achievement Spelling Test was administered to 6,481 third-grade pupils. Seven per cent of the pupils did as well as, or better than, fifth-graders. Twelve per cent did not do as well as second graders. Of the 6,520 third-grade pupils who were given the Stanford Achievement Arithmetic Reasoning Test, 8.4 per cent did as well as, or better than, the average fifth-grade pupil. About 6 per cent did not do as well as beginning second-grade pupils. In the arithmetic computation test, less than 6 per cent did as well as, or better than, fifth-grade pupils; 4 per cent did not do as well as second-grade pupils.

Wrightstone, who analyzed the data in this study, is aware of the influence of intelligence, bilingualism, and other factors in the reading, spelling, and arithmetic tests. His findings show the variation in levels of ability that exists among third-grade pupils in all of the schools of New York City. He concludes that this condition points to the need for differentiated curricula for the different types of school populations in these schools.

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[2] J. W. Wrightstone, *Analysis of Intelligence and General Achievement, Third Grade Classes (New York City), March-May 1949*, Final Summary Report (typewritten copy) (New York: Bureau of Reference, Research and Statistics, New York City). The data used here for the specific purposes of this discussion by no means give a complete picture of Dr. Wrightstone's analysis of the interrelationships of intelligence, achievement, and other factors, together with their implications.

New York City reading ability in 7A.[3] The Stanford Achievement Reading Test was administered to 11,178 pupils in grade 7A. On the paragraph-meaning part of the test, the scores of 304 of these pupils reached or surpassed twelfth-grade ability, whereas 1,328 had scores at or below fifth-grade ability. The range of the 7A scores in paragraph meaning was about "8 years for the city as a whole."

New York City eighth-grade reading and arithmetic ability.[4] In January, 1949, a city-wide survey of the intelligence and reading ability of eighth-grade classes was made. In March, the New York Arithmetic Computations Test was given. The 25,638 pupils who were given the Paragraph Meaning Test of the Stanford Achievement ranged in grade scores from the fourth-grade to the college level. The scores of 577 pupils were at or below the fourth-grade level, whereas the scores of 420 were above twelfth-grade norms. The Arithmetic Computations Test was given to 26,017 eighth-grade pupils. About 35 per cent of them made scores above the twelfth-grade norm; 3 per cent made scores below the fifth-grade norm.

Reading disabilities in eleven states.[5] Alden, Sullivan, and Durrell tested the reading achievement of 6,364 children in grades two through six. The children lived in twenty communities in eleven states. They found that about twice as many boys as girls were retarded one or more years—18.6 per cent of the boys and 9.8 per cent of the girls. The comparisons on the different grade levels were: second grade, boys 9.7 per cent, girls 4.2 per cent; third grade, boys 14.7 per cent, girls 7.1 per cent; fourth grade, boys 23.6 per cent, girls 12.0 per cent; fifth grade, boys 24.5 per cent, girls 11.6 per cent; sixth grade, boys 13.7 per cent, girls 9.9 per cent.

Thomas examined 2,918 sixth-grade pupils and found that 13.4 per cent of them were reading below expectancy in terms of mental age.[6]

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[3] J. W. Wrightstone, *Analysis of Results: Survey of Intelligence and Reading Ability in 7A Classes, Junior High Schools, February, 1947*, Final Summary Report (typed) (New York: Bureau of Reference, Research and Statistics, New York City, March, 1948).

[4] J. W. Wrightstone, *Survey of Intelligence, Reading and Arithmetic Ability in 8th Grade Classes, January-March 1949*, Final Summary Report (typed) (New York: Bureau of Reference, Research and Statistics, New York City, 1949).

[5] C. L. Alden, H. B. Sullivan, and D. D. Durrell, "The Frequency of Special Reading Disabilities," *Education*, LXII (Sept., 1941), 32-36.

[6] G. I. Thomas, "A Study of Reading Achievement in Terms of Mental Ability," *The Elementary School Journal*, XXVII (Sept., 1946), 28-33.

TABLE 21-1

The Ohio Every Pupil Tests, April, 1957.[7]

Subject	*Algebra*	*Plane Geometry*	*Chemistry*	*Physics*	*World History*	*Contemporary Affairs (12th Grade)*	*Latin II*	*Usage English (12th Grade)*
Possible Score	50	80	100	100	100	100	93	80
10% of Scores were above	29	56	61	56	70	68	63	77
10% of Scores were below	7	20	23	21	31	28	27	50
Pupils whose scores were reported	14,222	9,728	6,891	5,746	12,435	13,811	6,544	13,141

The Ohio Every Pupil Tests. In Table 21-1 are presented selected data from eight high-school subject tests. The highest possible score on the algebra test was 50. Of the 14,222 pupils' scores reported, 10 per cent were above 29; 10 per cent were below 7. Similar readings can be made for each of the other subject tests. Wide individual differences are reflected in these test data.

A summary of investigations of the use of maps, globes, and other visual aids as teaching devices has indicated that numerous errors are made by pupils in reading maps.[8] This disability, common also among teachers, could be prevented if map reading were taught specifically and concretely.

At the initial meeting of forty-nine graduate students in a first course in statistics, the instructor administered a test consisting of the fundamentals of arithmetic and algebra that were essential to success in the course. As there were forty-one items in the test, the highest possible score was forty-one. Three students made a score of thirty-four, and three made a score of zero. Twelve members of the class made scores below sixteen; only twelve made scores above twenty-seven. With guidance, most of the students were able to relearn the essentials and pass the course.

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[7] R. G. Wood, "Percentile and Item Norms for April 1957," *Every Pupil Test* (Columbus: Ohio State Department of Education, 1957), pp. 5-6.

[8] W. S. Monroe, (ed.), *Encyclopedia of Educational Research* (rev. ed.; New York: The Macmillan Company, 1950), p. 1233.

Why do pupils drop out of school? During the school year 1947–1948, approximately 14 per cent of the twenty-four million children from five to seventeen years of age were not in school. Although many studies of drop-outs have been and are still being made, the Syracuse Study is somewhat typical.[9] Of the students who completed the ninth grade from October, 1928, through October, 1946, 44 per cent did not graduate from high school. These drop-outs, representing all of the major occupational groups of the city, were interviewed for the purpose of learning what reasons they gave for leaving school. Although there may be some doubt as to the real causes, the admitted reasons are not without merit. In order of frequencies, the following reasons were offered by the people interviewed: dissatisfaction with the school, inability to see any relationship between the subjects being studied and anticipated life work, dissatisfaction because of not being with pupils of the same age and size, conflicts with the teacher, difficulty in learning, general dissatisfaction with school offerings, credits for work insufficient for graduation, and numerous other reasons.

The scholastic aptitude-test records of the people who were interviewed indicate that over half of the drop-outs could have successfully completed subject courses as they are now organized. Nearly all of the other individuals could have achieved academic success if certain adaptations in course requirements, teaching methods, and pupil-teacher relationships had been made.

Generally only the extreme cases of learning or subject disability come to our attention as problems demanding consideration. There are many reasons for this. Most pupils, although they work on a level of performance far below their capacities, nevertheless satisfy their teachers. Others are judged by their best efforts rather than by their weaknesses. All those whose capacities are above average appear strong even though their potentialities have not been fully realized. It is the deviate far below average who is most noticed.

Causes of subject disabilities

The causes of subject disabilities are numerous. Although many contributing factors may be listed, they do not operate singly. One combination of factors results in one type of disability, and another combination in a totally different type. An analysis of all causal factors involved reveals that there are both predisposing and precipitating factors and that these may be regarded as being biological, sociological, or psychological in nature. There may be certain structural weaknesses due to heredity, brain damage, endocrinal disorders, sensory defects, virus infections, malnutrition, and the like. Then there is the impact of numerous environmental and sociological factors. All of these factors, directly or indirectly, affect the child's learning. Since this topic has been fully explored in Chapters 4, 5, and 6, and since the school must begin with the child *as he is,* it will suffice here simply to emphasize that many learning difficulties stem from unfortunate learning experiences, lack of learning readiness, and incorrect habits and attitudes. Often techniques acquired at school cannot be used in out-of-school situations. The experiences of childhood gained in the home, school, and elsewhere are frequently so piecemeal, fragmented, or unrelated that the child fails to understand or perceive any relationships or patterns. This lack of understanding, whatever its cause, is doubtless responsible at least in some degree for many children not making full use of whatever potential and abilities they possess. The factors mentioned above certainly account for a larger number of subject disability cases than do structural impairments. Structural impairments, however, are often serious and should not be minimized. Not infrequently an individual exhibits disabilities resulting from both types of causes.

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[9] H. P. Smith, *Syracuse Youth Who Did Not Graduate* (Syracuse, New York: Board of Education, 1950).

Three subject disability cases

The following extracts from subject disability cases may serve to illustrate the nature of some of the difficulties that pupils experience in learning, some of the factors that help to produce these difficulties, and some of the corrective measures that may be used.

Upon examining these sample cases, one becomes aware of the interrelatedness of the factors that have produced the disabilities. Some of the factors are so obvious that one wonders why the classroom teacher has not discovered them. Of course, teachers who are aware of the importance of such factors are constantly discovering and correcting them.

Studying the following cases may help the teacher to become more aware of the symptoms of learning difficulties and the importance of analyzing their causes as early as possible. This study may also help make clear the relation of the specific difficulties and their causes to the program of correction.

However, one must realize that no two cases of subject disability are alike. No two cases can be handled in the same way. And no teacher should expect to find in these cases a solution for any particular disability problem.

Extracts from three cases are presented, one in arithmetic, one in reading, and one in spelling. There is no attempt to give the complete history of any case. Certain elements have been selected for illustrative purposes only.

A case in arithmetic. Paul was an eleven-year-old sixth-grade boy whose parents were college graduates. He was a good reader and enjoyed biographies and stories of inventions and discoveries.

In speaking of his school work, Paul's mother said, "He just does not have any sense in arithmetic." She was convinced that he had no mathematical ability and remarked that he was much like his father in this respect.

Paul's score of 20 on the Woody-McCall test, Form 2, was slightly below the median for his grade. A score frequently covers up the essential facts.

He missed problems 3, 5, 14, and 18. His responses are given here in bold face type.

Problem
No. 3

$$\begin{array}{r} \mathbf{4} \\ 9\overline{)27} \\ \mathbf{27} \end{array}$$

Problem
No. 5

$4 \times 8 = \mathbf{24}$

Problem
No. 14

$$\begin{array}{r} \mathbf{757\tfrac{1}{4}} \\ 8\overline{)5856} \\ \underline{\mathbf{54}} \\ \mathbf{45} \\ \underline{\mathbf{40}} \\ \mathbf{56} \\ \underline{\mathbf{54}} \\ \mathbf{2} \end{array}$$

Problem
No. 18
Multiply

$$\begin{array}{r} 8754 \\ \underline{8} \\ \mathbf{69{,}824} \end{array}$$

His difficulty in problem 14 was his response 54 to 7 × 8. He made the mistake twice in his problem. In number 18, he made two errors: 8 × 4 equals 24 and 7 × 8 equals 54.

The Wisconsin Inventory Test, Number 3 (Multiplication), was administered. This test presents the 100 simple combinations. He made the following errors:

Every zero combination
6 × 4 equals 25
4 × 6 equals 25
7 × 8 equals 54
8 × 7 equals 54
9 × 9 equals 72

He was then given test 1 (Addition) and test 2 (Subtraction) of the Wisconsin Inventory tests. He made two errors on test 1, and no errors on test 2. He was given test 3 (Multiplication of whole numbers), Form A, of the Compass Diagnostic Test in Arithmetic. In Part 1, covering basic multiplication facts, he missed the following combinations:

Every zero combination
6 × 4 equals 25
4 × 6 equals 25
8 × 7 equals 54
4 × 9 equals 27
1 × 2 equals 3

He made one error on Part 3: *24 and 2 equals 28.*

His many errors in multiplication will help the teacher to understand the causes for his discouragement in arithmetic.

TABLE 21-2

Errors made by Paul on three tests

Combinations	*No. of Errors*	*Per Cent of Total Errors*
Zero	30	48%
7 × 8 or 8 × 7	11	17%
6 × 4 or 4 × 6	7	10%
4 × 8 or 8 × 4	7	10%
4 × 9 or 9 × 4	4	7%
All other errors	4	7%
Total Errors	63	99%

The foregoing were his only difficulties in the fundamental combinations of whole numbers. He was consistent. Whenever he met 0 times a number, 7 × 8, or 6 × 4, he always gave the same response.

The writer was interested in discovering why he gave the response 25 to 6 × 4. He said that he worked it out in his head "Of course, I now know and don't have to work it out in my head. I did not always know it. I knew that 5 × 4 was 20. Then I said that one more 5 was needed. Then I added 20 and 5 together and got 25. 6 × 4 is 25." He was asked to count 6 groups of 4 tallies each. When he came to the last tally but one, and had only 23, he stopped counting and said. "Something is wrong. There are only 24." He counted the tallies the second time, making sure that there were 4 tallies in each group.

Paul explained how he obtained the answer 54 to the problem 7 × 8.

His method of procedure was similar to the one presented above. "I knew 6 × 7 was 42, and I knew that 2 × 6 was 12. Then I added in my head 42 and 12 and got 54." He did not know why he got 8 when he multiplied 0 × 8, but he believed that 8 was the right answer.

Here was a sixth-grade boy of more than average intelligence, all tangled up and discouraged in arithmetic because of a few incorrect responses that had become a part of him. He was convinced that he was a failure in arithmetic. His parents and teachers believed that he did not have the necessary innate capacities for success in arithmetic.

Within an hour after the stranger met the boy, he knew where the specific difficulties in the fundamental combinations were. It is the writer's conviction that these few specific errors were the primary causes of his failure. To these were added the discouraging comments of his teachers and parents, and the cumulative effect of repeated failure.

The specific difficulties were written in red in a notebook labeled *My Trouble Book,* and given to Paul. Here are the entries:

Difficulties in the simple combinations:

1. No difficulty in addition.
2. No difficulty in subtraction.
3. The following difficulties in multiplication:
    a. All zero combinations.
    b. $7 \times 8 = 56.$
       $8 \times 7 = 56.$
    c. $6 \times 4 = 24.$
       $4 \times 6 = 24.$
    d. $8 \times 4 = 32.$
       $4 \times 8 = 32.$
    e. $9 \times 4 = 36.$
       $4 \times 9 = 36.$

When Paul was told that these were his major difficulties and that he could overcome them in a very short time, he was happy. He immediately took his "trouble book" to his mother. The next morning he came back, and with a gleeful shout, said, "I've got 'em now!" He still had before him, however, the long and difficult task of overcoming the effect of repeated failure upon his self-esteem. He also had yet to face the lack of confidence in him that his years of failure had established in the minds of teachers, classmates, and parents.

Paul's teachers, who had worked with him for years, had not discovered the factors in his failure. It is unfortunate that his teachers had not acquired the skills, knowledges, attitudes, and techniques that would have discovered the difficulties when they first appeared. It would have meant a great deal to Paul had steps been taken to eradicate his errors when he first made them. In the classrooms are thousands of boys and girls whose stories, if known, would parallel Paul's.

A case in reading. The following brief summary of Case No. 8, presented by Baker and Leland, gives a picture of the various factors and the techniques used.[10]

This third-grade boy was ten years, three months old. Under "Symptomatic Behavior," the author listed eight social and thirteen educational items. Among the social items were the following: had temper tantrums at home, but never at school; was very careless with his toys and possessions; had no responsibility at home; shrank from new situations and contacts with strange children; would not stand up for his own rights. Among the educational items were the following: read very slowly; his head movements brought his left eye nearer the page; had difficulty in sounding out words; made a number of reversals; could not decide whether reversals were correct or not; score on Gray's Oral Reading Test was 10 below first-grade norm; on Haggerty Sigma I, his grade level was 2.6; read with expression what he could read; arithmetic offered no trouble.

Additional information. His Stanford-Binet Age was twelve years, three months, and his Ferguson Form Board Age thirteen years, two months. The boy wrote beautiful nature poems and interesting stories, although no one could read them. He was skillful in making toys and lifelike figures of horses and dogs. His drawings were fine; however, some of them were upside down and others were reversed. He was a *mirror writer.*

He sighted with his left eye, which appeared to be dominant. This suggests that his left hand should have been used in handwriting. As a matter of fact, his left hand had always been dominant as far as could be learned from the boy.

Teachers did not understand him. At the end of the first year, he was sent home with a note asking his mother to teach him to read. His mother discovered that he began to read in the lower right-hand corner and tried to read to the left and up the page. His teacher had not made adjustments in order to meet his needs. Several medical experts and one psychologist had failed to solve his reading problem.

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[10] H. J. Baker and B. Leland, *In Behalf of Non-Readers* (Bloomington, Ill.: Public School Publishing Company, 1934), pp. 24-33.

His parents and sister were superior in intelligence. His home environment was excellent, with an abundance of meaningful materials, toys, games, books, and pets.

Diagnosis. A mental quirk was the source of his failure. He had a very low vocabulary of sight words because he saw words and letters backwards. He knew that this was not correct, but could not always control it. He attempted to keep his direction by pointing. There were some indications of instability in handedness. These conditions produced intense emotional disturbances, yet he was anxious to read in the face of all these difficulties.

Remedy. The following remedial measures were suggested:

1. Explain his difficulties to him in the simplest words. Show him the direction in which his eyes are to follow the lines. Explain to him that for some reason he has habits that cause his eyes to move in the opposite direction. Tell him that he is intelligent enough to correct this.
2. In order that he may have vivid kinesthetic, vocal-motor, and auditory imagery of a word, have him trace over the word written in large script, at the same time sounding the word. Have him repeat the procedure several times.
3. Encourage and help him to improve his phonics.
4. Use devices that will help him to begin seeing the word in the proper direction.
5. With the aid of the blackboard, build words into simple, interesting, and attractive stories.
6. Have him read orally from an attractive first-grade book. Help him follow the lines by the use of a marker.
7. Help him accept his responsibilities by placing interesting stories on his desk and encouraging him to read them.
8. Be sincere with him and encourage him whenever possible.
9. Have him teach beginners through the use of flash cards and games. It will encourage him to learn the words first.
10. Tell his mother that he will learn to read.
11. Help him make contacts with suitable companions.
12. Help him start a little book of his own poems. Find poems that he can read. Type them for him.

Results. Within ten months, tremendous changes occurred in this boy. His reversals cleared up. His attitude toward reading changed. His average reading grade was now 3.5 on the four tests: Gray's Oral Reading Test, Haggerty Sigma I, Gates Silent Type A, Gates Silent

Type B. He had read several primers. His spelling had improved. He liked to make friends and play with them. At home, he was accepting responsibilities. There was every reason to believe that he would continue to improve.

A case in spelling. Book has presented an interesting case of disability in spelling which is of special interest.[11]

This sixth-grade boy with an IQ of 120 had not learned to talk so that his mother could understand him. He could read. No one could read what he had written. He could write only 35 per cent of 120 third-grade words when they were pronounced. Words that he had misspelled looked correct to him. When he was asked to copy the 120 words, he made but one error.

The words that he could not pronounce gave him most trouble. He tried to spell words by sounds. He did not know the correct sounds of letters and could not pronounce them.

Great care was used to observe everything that he did while studying spelling. He said that hearing the teacher use a word in a sentence helped him in his spelling. Words that looked alike caused him great difficulty. His teacher had required him to write the words, sound them, and study that at home. No one had shown him what he had to do to write words correctly. No one understood what his difficulties were.

Method. The boy had very good visual imagery. He was shown how he could write each word correctly after he had the correct image of its letter sequence. He was encouraged to compare his image of a word with the word itself. An attempt was made to eliminate the old vocalizations. Since he could visualize, this was soon accomplished. Specific directions were prepared, typed, and placed in his hands.

Under the heading, "How to learn to spell each word," Book directed the boy's attention to certain specific suggestions: study one word at a time, examining it and its meaning with care; have some one pronounce it; notice the exact order of the letters; notice the parts of the word you know; repeat two or three times, then close your eyes: can you see the word?—if not, try again; as soon as you see the word with your eyes closed, write it; compare the written word with the correct word.

Under the heading, "How to learn each word so well that it won't be forgotten," he listed eight suggestions: study each word, as indicated above; be sure your mental picture of each word agrees with the printed word; think frequently of the printed picture; notice the exact order of the letters of the word; think of its meaning; re-examine the printed word you are learning to spell; never guess; review all words you have learned.

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[11] W. F. Book, "How a Special Disability in Spelling Was Diagnosed and Corrected," *Journal of Applied Psychology*, XIII, No. 4 (1929), 378-393.

Results. On the initial test near the beginning of summer school, he had spelled, on the average, about 30 per cent of words for the third and fourth grades selected from the Ayres-Buckingham Spelling Scale. Before he went home in August, he spelled sixteen groups of twenty words each and missed but five words.

When he went back to school in September, a halt in his learning occurred because of: (1) the pressure of other school work; (2) the influence of a teacher who did not understand his handicap and had no interest in him; (3) the length of time—the summer term was too short for him to learn all the words he needed. His mother's influence, however, helped him to salvage enough spelling ability to meet his needs.

Principles of prevention, detection, and correction of subject disabilities

There are several important generalizations that should be helpful in preventing, detecting, and correcting disabilities:

1. The teacher must spontaneously accept children or young people as they are. He must be sensitive to them as persons and to their needs. He must be able to establish and maintain free communication between pupils and himself.

2. It is essential that teachers and administrators be aware that physical disabilities exist and that something can be done about them. Some physical disabilities can be corrected before the child goes to school. Many schools recognize the importance of periodical physical and medical examinations of various kinds while the child is in school. The teacher should know the nature of the pupil's physical handicaps and their significance.

3. The teacher must have an understanding of the pupil's background and the social forces that have molded him. The child's experiences depend upon these forces. His skills, habits, attitudes, interests, knowledge, and ideals have developed as a consequence of these forces. If the teacher is to tap the child's world of interests, he must be familiar

with that world. If the teacher is to be a definite influence in making it possible for the child to grow, he must know what the child is, what the child understands, and how the child understands. Knowledge of these characteristics is basic to the correction of the pupil's present difficulties and the prevention of further difficulties.

4. The teacher needs to know how children learn and how their learnings may be made to function in life situations. Educational psychology, if learned in relation to life situations, will help the teacher to predict and control the learnings and adjustments of pupils with greater efficiency. By understanding how pupils learn, how their mental processes operate, and what mistakes they are likely to make in learning, the teacher is better equipped to give guidance that will prevent mistakes and promote growth. Some mistakes in learning may be converted into steppingstones to success; others are of little or no consequence; whereas still others are serious in their potentialities. Mistakes that are superficial may drop out without any effort on the part of the teacher and without resort to diagnostic and remedial procedures. It is likely that certain mistakes are aggravated when the pupil's attention is directed to them. Not infrequently, disabilities disappear rather suddenly when the pupil senses a goal that seems worth-while to him, when he becomes vitally interested, or when creative urges are utilized by the teacher.

5. The teacher should know how children learn a specific subject. He should be able to judge whether or not the learner is developing normally in an understanding of the subject. No one knows the complete story of how a child learns, but much is known and is available.

The adult lives in one world and the child in another. The adult does not remember the exact steps by which he learned. Even if he could, his steps probably would be different from those of the child having difficulty. The teacher needs help in becoming familiar with methods and techniques that may be used to avoid disabilities. Subject disabilities would be greatly reduced if every teacher knew how each child learns a specific subject, and understood the implications for teaching procedure.

6. Curricula that are within the needs, capacities, and interests of pupils should be developed. The few essentials that really count should be selected and utilized in such ways that the desired skills, habits, attitudes, techniques, knowledges, appreciations, and ideals are developed. The pupil should be an integrated whole rather than a compartmentalized individual.

7. Failure to provide for individual differences is one of the causes

of disabilities. Though much has been discovered about the nature of individual differences, this knowledge has not been fully utilized in practical school situations. The formalistic, easy-moving administrative setup of mass instruction will not be broken down and replaced by more efficient systems until administrators and teachers are moved by the full significance of individual differences. One need but visit the better modern schools to realize the important consideration given by them to individual differences. Little can be done by teachers until administrators are convinced that an important part of their job is to recognize individual differences and to provide for them with suitable equipment, organization, incentives, and guidance.

8. The established principles concerning transfer in learning should be utilized. Frequently, little relationship exists between a teacher's knowledge about transfer and his methods of teaching. Many teachers continue to teach as though experiences acquired in one situation will be used in all other situations. If significant learnings are to function, the pupil must be given varied opportunities to utilize them in his world of reality.

9. In mastering new units or subjects, it is generally advisable to build new experiences or learning on the pupils' past experiences. If the learner has had the necessary experience, the teacher must connect the new learning or experience with it; but if the learner lacks the necessary ground or experiences for eliciting the proper attitudes, meanings, and feelings, these experiences must be provided. The interpretation of new experiences in the light of previous experiences and attitudes of mind has long been known as *apperception*.

10. It is essential that the teacher be acquainted with the nature of disabilities in general. He should also be familiar with the literature on disabilities in his major fields. Attention is directed to the bibliography at the end of the chapter. Contributions are constantly appearing in educational periodicals and books.

11. The teacher should secure as many significant facts as possible concerning each pupil in his class. In addition to physical condition and social background, such factors as intelligence, aptitudes, achievement in subject matter, work habits, school history, accomplishments outside the classroom, interests, attitudes, and aspirations are important.

12. Every teacher should have a mastery of the simpler tools and techniques for uncovering disabilities. These are available to every teacher. He should also know about the more elaborate tools and tech-

niques that generally are available in clinics or which are employed by guidance workers and school psychologists.

13. The teacher must develop sensitivity to symptoms and signs of learning difficulty. He should be prepared to use appropriate means of discovering the nature of the difficulty as early as possible. In many instances, an intelligent teacher has discovered the specific root of the trouble by means of a sympathetic, analytical conference with the pupil, or by close observation of the way in which he works. The teacher who recognizes the early symptoms of disability and knows the means that are available for diagnosis will soon discover whether more elaborate means are necessary.

14. If the pupil continues to fail after the teacher has done what he can to solve the difficulty, the case should be referred to the specialist. The competent specialist in the clinic has the training and professional equipment that enable him to diagnose the more difficult cases and to suggest corrective measures.

15. There must be a carefully planned program of correction. The greatest criticism against the general testing program is that little use has been made of it in helping the pupil. Corrective materials and techniques have been developed and should be used.

16. This program of correction must seek to replace inadequate experiences, incorrect habits, and unfavorable emotional sets with adequate experiences, correct habits, and favorable emotional sets.

17. The teacher must be ready to work with the pupil at the level of the abilities, acquisitions, and interests that he has at any given time. The importance of the pupil's interests is especially acute when his interests are on a mature level while his achievements are on an immature level.

18. Appropriate materials of instruction must be chosen in relation to the pupil's level of achievement, the habits to be formed, and the range and maturity of his interests.

19. The teacher must build up within the pupil a belief in himself, a belief that he can do better. The pupil is hopeful when he knows the nature of his errors, his weaknesses, and his strong points, and what can be done to overcome his difficulties.

20. The teacher should seek to develop methods that will tend to reduce the number and seriousness of disability cases among pupils. Each experience in detecting and correcting disabilities should make him more aware of essential teaching steps. He knows that it is often

the omission of some important intermediate step that causes trouble He realizes that the little, apparently insignificant, and frequently unnoticed, misunderstandings of the day may have serious consequences. He is alert to discover the steps the omission of which may be serious.

Diagnosis and correction of subject disabilities

Data to be secured. Mention has been made of kinds of information that the teacher needs in order to work intelligently with any pupil, and especially with the pupil having difficulty in learning. The following paragraphs present a more detailed study of this information.

Not all of the data outlined here would be required in any one disability case. The different items are so interrelated that certain ones become significant in the presence of certain conditions or symptoms, whereas others become significant in the presence of other symptoms or conditions. In the diagnosis of a wide range of cases, each of these items of information would prove valuable in one or more instances.

The alert teacher can learn to discriminate in the selection of areas of investigation. Just as a physician probably would not examine blood pressure in the diagnosis of a fractured arm, so a teacher would not make an intensive study of the social background of a pupil in order to discover the nature of his reading disability if the physical examination revealed extreme nearsightedness. The general nature of the disability, together with the significance of the information already secured, will guide the teacher in choosing the most efficient methods and tools by which to proceed from any given point in the diagnosis.

1. *Physical condition.* Any serious loss of hearing may be detected by the watch test or the whisper test. If there is any doubt about the pupil's ability to hear, a careful examination should be made with the aid of an audiometer.

The eyes should be examined by the use of visual screening tests, such as the Eames Eye Test, Keystone Telebinocular Tests of Visual Efficiency, and the Visuascope. If these reveal that the eyes are not normal, the eyes should be examined by an eye specialist.

Significant health factors include posture, nutrition, exercise, sleep, height, weight, and so on. Defective teeth, diseased tonsils, and adenoids are frequently sources of trouble. Some of these factors are observable by the teacher, the parents, and the school nurse, but the pupil's general physical condition should be checked periodically by a physician. This check is especially important in the case of the pupil who is having difficulty in learning.

2. *Intelligence.* The measurement of intelligence is an important approach to a better understanding of the pupil's potentialities or capacity for learning.

3. *Aptitudes.* It is important that the teacher learn as much as possible about the pupil's aptitudes. This information can be used in assisting the pupil to gain confidence in himself and to secure the respect of his class.

4. *Achievements.* The scores made by a pupil on a survey achievement test, such as the Stanford Achievement Test, are useful as indications of the pupil's achievement in each subject. Any deviation of one-half year or more from the expected level performance should be carefully examined. If there is any question about the pupil's achievement, appropriate diagnostic tests should be used. Care must be exercised to select the most useful and time-saving tests. The author has not found any one test or prepared battery of tests that is satisfactory under all conditions. Each valid and reliable diagnostic test has its specific usefulness and its limitations.

5. *Social and emotional adjustment.* The teacher should become a good judge of behavior. He should notice the pupil's behavior in various situations. The pupil who is having serious difficulty will give evidence of it by the way in which he responds to various situations in and out of school. Prolonged failure is conducive to the development of emotional and social maladjustments. Likewise, emotional and social maladjustments tend to inhibit normal learning.

It is important that the teacher record his observations of the pupil's emotional and social reactions from time to time. He should also seek the observations of others who know the pupil both in and out of school. All of these observations should be included as a part of the pupil's permanent record.

Prepared rating scales are very useful. Torgerson's Pupil Adjustment Inventory, for instance, lists ten types of behavior: social attitude, emotional control, nervousness, daydreaming, responsibility, interest, laziness, happiness, conduct, and success in school. Normal behavior and three levels of maladjustment are described for each of the ten items.

6. *Work and study habits.* The teacher should know as much as possible about the pupil's work and study habits. He can observe certain habits during school hours. Interviews with the pupil, with his

parents, and with other teachers will provide additional information.

7. *Interests.* If the teacher knows the pupil's interests, he can use them as initial mainsprings of action that may help in time to overcome unfortunate emotional sets associated with other learning situations. It is important for the teacher to know the interests of each of his pupils, but it is mandatory that he know the interests of those who have serious subject disabilities.

The teacher may supplement his own observations of the pupil's interests by the observations of others who know the pupil in and out of school, and with the pupil's own statements. Prepared forms for recording interests are convenient.

8. *Accomplishments.* The teacher should discover the successes that the pupil has experienced. What has he accomplished in school, at home, in the community, and in organizations to which he belongs? Knowledge of one's own success and the appreciation of others are powerful motivating forces. It makes a great difference to the pupil to know that the teacher who is aware of his failures is equally aware of his acceptable accomplishments. A perspective of the pupil's failures in relation to his successful experiences is basic to any successful approach in trying to help him overcome his difficulties. The teacher must recognize the pupil's total personality.

9. *Aspirations.* The teacher who is able to catch an understanding of the pupil's dreams and to see latent potentialities in his crude efforts may be able to capitalize his initiative and direct its expression. By so doing, he creates confidence in the learner that he can do something that others appreciate.

10. *Attitudes.* Attitudes play an important part in the daily life of the pupil. If the teacher understands what to look for, valuable evidence can be secured in a short time. He should know the nature of the pupil's attitudes toward his own successes and failures, toward his school, his teachers, particular subjects, persons of his own age, younger persons, older persons, unfortunate persons, his home, his family, his competitors, his pets, public and private property, legal authority, his employers, and his responsibilities.

11. *Home.* The child's life and learning are greatly influenced by his home situation. If the teacher wishes to understand the behavior of the child, it is highly desirable that he visit the home and thus gain some insights into family relations, parental attitudes, and conditions in general. An intimate knowledge of the family situation can be very helpful to the teacher in his teaching.

12. *School history.* A cumulative record should be kept for each and every pupil. Relevant data concerning any child should always be available to the teacher. The record should include significant school experiences and personal data; physical and health record; scores on intelligence, aptitude, and achievement tests; adjustment, attitude, and character ratings; evidence of interest, accomplishments, and aspirations; schools attended and dates of attendance; teachers' ratings and anecdotal records on special achievement and conduct; and a record of significant home and work experiences.

The importance of the school history is illustrated by a fifth-grade boy of better than average intelligence who was having serious difficulty in arithmetic. He was an excellent reader and he enjoyed all of his school work except arithmetic. He had spent his first three school years in a school that taught number or arithmetic work in these grades only incidentally. When the boy was transferred to a more conventional school at the beginning of his fourth school year, he was placed in the fourth grade on the assumption that he possessed a mastery of the fundamental number combinations. The teacher expected that the boy would move along with other members of the class without supplementary help. When it was discovered that he did not know the combinations, the teacher expected him to learn them in a very short time, and to keep up with other members of the class. In the year and a half that the boy was in this school he had not learned the combinations and had become very much discouraged about arithmetic. Had his teacher realized the significance of his previous school experiences as well as the time required to gain an understanding and mastery of the number combinations, he would have directed him in a very different manner.

Interpretation of data. After data on subject disabilities have been secured, they must be carefully examined in order to determine their significance in relation to the pupil's difficulty in learning and their implications for the program of correction. Significant facts must be sifted from the insignificant and seen in their relation to one another. Mere possession of all the facts in the case will not solve the problem unless the teacher has the insight to interpret their meaning. A teacher with keen insight and poor tools will go farther in the diagnosis and correction of disabilities than a teacher with all the tools and little insight. The ideal is, of course, the teacher with insight, aided by all that refined methods, tools, and instruments can contribute to the understanding of the case.

The questions listed below, although not exhaustive, suggest the *kind* of inquiry that must be constantly in the mind of the teacher as he examines data. Many related questions will occur to the intelligent teacher as he works with a particular case. Some of the questions are related primarily to diagnosis and others primarily to corrective procedure. Although it is impossible to build the corrective program intelligently until the diagnosis has been completed, discoveries made in the process of diagnosis often suggest implications for the corrective procedure. Such implications should be recorded at once for later consideration. After each area of investigation has thus been examined, the task of evaluating and summarizing will remain, first, in relation to diagnosis and, second, in relation to correction.

1. *Physical condition.* Does the pupil have any serious physical handicap? If so, does it constitute a major cause of the pupil's difficulty in learning? If not a major factor, may it be a contributing factor? What other unfortunate aspects of the pupil's personality or behavior may be the result of his physical handicap?

2. *Intelligence.* Do the scores on intelligence tests need to be re-evaluated in the light of special factors in the case? For instance, a non-reader will make a low score on tests that assume the ability to read, even if his intelligence is normal or high. Is the pupil's progress in keeping with his intelligence, as indicated by the tests? Is too much or too little being required of the pupil in the light of his intelligence? What is the significance for the corrective program of the evidence revealed by the tests?

3. *Aptitudes.* Do the tests reveal special abilities, and to what degree? Are there areas in which there appears to be a conspicuous lack of ability? Are the weaknesses such as to constitute the basic cause of the pupil's specific difficulty in learning? Are there special abilities that may be used to help establish the pupil's self-confidence and the respect of his classmates? Are there abilities that may be used to motivate the pupil to overcome his weaknesses in order to succeed better along the lines of his special ability? Should the pupil be encouraged to follow a curriculum that will enable him to utilize and develop his special abilities? Can the special ability be used as a supplementary mode of expression in the field of his learning difficulty?

4. *Achievements.* What do survey, diagnostic, and prognostic tests reveal? In the subject under consideration, is there a discrepancy be-

tween the pupil's achievement and the normal achievement at his grade level? Is there a discrepancy between his achievement and the normal achievement at his chronological age? Is there a discrepancy between his achievement and that which should normally be expected on the basis of his mental age? Is the pupil's performance satisfactory in certain areas within the subject field under consideration? What are the strong and weak points in this field? Is there any consistency in the errors that are made, so that specific incorrect habits can be isolated? Is there satisfactory performance on the simpler levels and confusion on the higher levels? Does he have an adequate command of the fundamental skills? If so, where does the confusion begin? Is there a general confusion at all levels of difficulty? How does the pupil attack a difficulty when he meets it? Does he have adequate fundamental skills, knowledges, and techniques for attacking difficulties? Has he a mastery of the basic vocabulary required in the subject? Do any language difficulties handicap him? How does his achievement in this field compare with his achievements in other fields? Does he have the background of experience necessary to the understanding of this subject? Does the subject matter have meaning to him, or does he memorize material or perform operations mechanically? Does he see relationships between the subject and everyday life?

5. *Social and emotional adjustments.* Is the pupil socially responsive in the presence of classmates in school and on the playgrounds? Is he socially responsive to teachers? Is he cooperative at school, in the home, in the community, and in organizations to which he belongs? Is there evidence that he lacks confidence in himself in relation to other persons or groups? Is he overly reticent? Does he defend his legitimate rights? Is he overly aggressive and dominating? How well does he adjust to the wishes and rights of others? Is he fundamentally antagonistic and noncooperative in the presence of the suggestions and activities of others? How intense are his likes and dislikes? How well does he adjust to unexpected changes in circumstances? How does he adjust to major disappointments? How objectively does he consider corrections or suggestions for improvement? What is his emotional response to the subjects that he is studying? What are his own explanations of his likes and dislikes?

What experiences would explain these characteristics? Has he suffered serious or repeated failures? Has he been discouraged by the comments of parents, teachers, or classmates? Does his social or economic background make him feel socially inferior or superior? Does he have physical handicaps that tend to make him self-conscious or conspicuous? What can be done to help him evaluate the nature and relative importance of any unfortunate experience or handicap, to see its possible compensations and the means of overcoming its unfortunate results?

6. *Work and study habits.* In the light of all the evidence, do the work and study habits of the pupil seem to be a major cause of his failure? Are they a contributing factor? At what point does the pupil most need help in the correction of his study habits? Is his study schedule at fault? Does he lack motivation? If so, how can he be motivated? Do the conditions under which he works at home need to be improved? Do members of his family need help in understanding what habits of work should be encouraged? What methods of study will be most helpful in overcoming his particular learning difficulty? Do assignments for independent work need to be lightened so that the pupil will have a reasonable chance of completing them in a thorough manner and in a reasonable length of time? Does he need close supervision in his study for a time in order that he may develop better methods and habits of thoroughness, and so gain an experience of success? How rapidly can he develop independence in doing systematic, thorough work?

7. *Interests.* What are the pupil's major interests in and out of school? Is there a relationship between any of his major interests and the subject under consideration? If so, is the pupil aware of this relationship? If not, how can the reality of this relationship be established? What projects and teaching materials would utilize these interests in the learning process? Are the pupil's interests on a more mature level than his achievement? How can his immature skills be made to contribute to his mature interest?

8. *Accomplishments.* What have been the pupil's most successful experiences in school or in leisure-time activities? Can they be utilized to help him overcome his difficulties? Can the pupil be made to realize that his teacher and classmates are aware of his successes as well as his failures? Can the pupil be given an opportunity to demonstrate his ability by making special contributions?

9. *Aspirations.* How can the pupil's aspirations be used to help him overcome his difficulty in learning? Can the teacher gain rapport with the pupil by giving evidence of a sincere enthusiasm for some

goal to which he aspires? Can the teacher help the pupil to realize some cherished ambition? Can the teacher help to establish in the mind of the pupil a vital relationship between the distant goal and some nearer goals that are within his reach? Would overcoming his specific learning difficulty aid the pupil in the attainment of some cherished goal? Can this relationship be pointed out in such a way that it will motivate rather than discourage the pupil? In the light of the pupil's special abilities, can the teacher constructively encourage the development of new aspirations that will help to motivate him? How can the teacher help the pupil aspire to the degree of mastery, in keeping with his ability, in the subject under consideration?

10. *Attitudes.* Has the investigation revealed attitudes that contribute to the pupil's difficulty in learning? Has he attitudes of indifference or antipathy toward school in general, or toward the specific subject? What conditions have contributed to the development of these attitudes? How may the corrective program best meet this problem? Has antipathy caused the failure, or has lack of success created the antipathy? How can the pupil be given experiences of satisfaction and success in connection with this particular subject? Should he be encouraged by placing him in a special group where assignments can be adjusted to his present needs?

Has repeated failure resulted in discouragement? Can the pupil be helped to view his failure objectively, to see the cause of his failure, and to gain the confidence that he can master it? Can attitudes of self-respect and confidence be encouraged by allowing him to make an occasional contribution that will capitalize his abilities and achievements? Should parents and others be encouraged to express faith in him and in his ability to overcome difficulties?

Is there a strong negative emotional reaction against the teacher of the subject in which he has difficulty? Is it possible to break down this emotional set, or should a new teacher undertake the corrective program? If the pupil appears indifferent to his own success in the subject, what means of motivation will be most effective in the light of his interests and aspirations?

11. *Home.* Are there factors in the home that contribute indirectly to the pupil's difficulty in learning, such as an economic or social standing that makes him feel inferior or insecure; a lack of interest in his success; an underrating of his ability; overanxiety about his success; poor provision for physical health; unfair or unwise criticism

of the school? Are there conditions that contribute directly to the disability, such as poor conditions under which to do homework; too much, too little, or the wrong kind of aid in doing home assignments; an overburden of responsibility of an overcrowded social program? How may the school help responsible persons in the home better to understand the pupil's needs so that desirable adjustments may be made?

12. *School history.* Does the pupil's school history reveal that the disability is one of long standing? Does the record reveal any circumstances, such as a change of school, prolonged illness, or the like, which help to explain the beginning of the disability? Does the history reveal that steps have been taken to correct the difficulty? Were any policies pursued that would tend to intensify the difficulty, such as promotion without adequate preparation for advanced work? Is there any record of experiences that would tend to create negative attitudes toward school or the particular subject? What is the significance of the school history for the corrective program?

The diagnosis. The diagnosis involves the identification of two elements: (1) the specific nature of the difficulty; and (2) the cause, or causes, of the difficulty.

The nature of the difficulty should be defined as clearly and as specifically as possible. This may be illustrated, in arithmetic, by reference to the case of Paul, discussed earlier in this chapter. It is not enough to say that the pupil does not multiply correctly. What kinds of mistakes does he make in multiplication? Does he know the fundamental number combinations involved? Does he consistently respond correctly to certain combinations and incorrectly to others? And so forth.

This phase of the diagnosis will be largely an interpretation of the data secured in the area of achievements, though these may be modified by information secured in other areas. For instance, a pupil who has some extreme physical, emotional, or language handicap that impedes oral or written expression may fail to give an accurate impression of his knowledges, skills, or understandings.

Having determined the nature of the difficulty, the teacher's next task is to determine the causes. All available data should be examined and re-examined in order to discover as many of the factors as possible. The factors may be so interrelated that it is difficult to distinguish between cause and effect. A cause in one case may be an effect in another. For instance, poor emotional adjustment may inhibit learning processes. On the other hand, unsuccessful learning experiences may lead to emotional maladjustment. In such cases, one must look further for the basic causes of the beginning of the failure. It is important to make such distinctions and to gain as clear a picture as possible of the causes of difficulty. In many cases, there will be a number of significant factors. Some will be primary causes, and others will be contributing factors.

Building the program of correction.[12] The program of correction is concerned with three major tasks:

1. The causes of failure should be removed or alleviated whenever possible. If this cannot be done, the pupil must be aided in overcoming or compensating for the handicaps.
2. The corrective procedure must seek to correct wrong learnings and to develop the skills, knowledges, attitudes, techniques, understandings, or appreciations that the pupil lacks.
3. The pupil should be helped to develop attitudes and methods and habits of work that are necessary for continued progress after special aid has been withdrawn.

No two cases of disability will call for the same corrective procedure. The procedure must be determined by the total combination of factors discovered in each case. However, certain questions point the way to elements that are important in the correction of most cases of disability. If the teacher has carefully collected all pertinent data and has studied it in the light of the questions on interpretation, he has already found some of the answers to these questions. However, the data should be re-examined in the light of each question in order to discover and bring together all the points that have a bearing on each aspect of the program. These questions are:

1. Which, if any, of the basic or contributing causes of the disability may be eliminated or alleviated through medical aid?
2. What may be done to remove or alleviate emotional, social, or other causes of failure?
3. How may the pupil be aided in overcoming or compensating for causes that cannot be removed? Can the school make adjustments

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[12] The program of correction may include individual or group therapy or other mental hygiene measures. Mental hygiene, rather than remedial instruction, is the answer in many cases of learning difficulties or subject disabilities.

in assignments, in the physical conditions under which the pupil works, or otherwise? Can the pupil be aided by a better understanding of the causes of his own failure and the means of overcoming them? Is it desirable that others who are close to the pupil (parents, teachers, and so on) be given a better understanding of the causes of the difficulty and the means of overcoming the handicap?

4. What may be done to establish the pupil's self-confidence and the esteem of his classmates, teachers, family, and friends? Has he special abilities or accomplishments that may be utilized to this end?

5. Of the skills, knowledges, techniques, understandings, or appreciations that the student lacks, which are basic to further progress and therefore require primary consideration?

6. What backgrounds of essential primary experiences need to be supplied, and how can this best be done?

7. Which of the pupil's present acquisitions need to be strengthened by review or use as a basis for the mastery of those that he lacks?

8. What psychological principles of growth and development are involved, and how may they be applied to the corrective program?

9. What modifications are desirable in the light of the pupil's intelligence and aptitudes?

10. How may the learning situations be made significant to the pupil? Can past experiences, special abilities, interests, accomplishments, or aspirations be made to contribute to this end?

11. What teaching materials are best adapted to meet the pupil's needs in terms of skills, knowledges, techniques, understandings, and appreciations, and at the same time to enlist his interest?

12. What methods of presenting the materials are most likely to succeed with the pupil in the light of his handicaps, likes, dislikes, interests, and abilities?

13. How may special corrective instruments, devices, and materials contribute to the mastery of the difficulties?

14. What modes of expression will be most meaningful to this pupil?

15. What opportunities may be provided for him to make extensive use of what he learns?

16. Under what environmental circumstances, both physical and social, is the corrective program most likely to succeed with this pupil?

17. How may the pupil be helped to develop methods and habits of work, both at school and at home, that will enable him to progress after special assistance has been discontinued?

18. What are the best means of making the pupil conscious of each step of improvement as the corrective program proceeds?

Evaluation of the corrective program. 1. Even though a careful diagnosis has been made, it is always possible that some important factor may have been overlooked, or its significance wrongly evaluated. Carrying out the corrective program gives the teacher an additional opportunity to discover specific difficulties and their causes. The teacher should continue to be alert and to study the pupil's reactions for evidence that will clarify the nature of the difficulty, its causes, and the procedure most likely to succeed.

2. The program of correction cannot be fully evaluated until it has been given a chance to succeed. This is sometimes overlooked. A boy was recently placed in a corrective reading class. After one week, his regular teacher told the corrective reading teacher that he had noted no improvement during the week, and that therefore the boy might as well come back into the regular reading class. A disability that has developed over a long period of time cannot be corrected in a few days or a few weeks. In general, the more advanced the case, the slower the progress probably will be, especially in the early stages.

3. On the other hand, if the proper sequence of learning experiences is provided under careful supervision, evidence of progress will appear within a reasonable length of time. If no such evidence appears, some adjustment needs to be made. The failure of a particular program does not prove that the pupil is hopeless.

4. Before the corrective program is revised, every possible effort should be made to discover the elements of weakness in the program that failed. The original data used in the diagnosis should be reexamined for significant points or relationships that may have been overlooked. The steps in the corrective program should be re-examined. Were the first steps beyond the pupil's ability? Were necessary steps overlooked? Were new situations presented too rapidly? Have the learning situations been made significant to the pupil? Has the pupil given evidences of negative reactions to elements in the program or to persons administering it? Can other persons near the pupil (parents, brothers, sisters, other teachers, and so on) throw any light upon the nature of the pupil's emotional reactions to the program? Have significant interests or aspirations been overlooked?

5. At suitable intervals, the pupil's achievement should be retested by the same methods and instruments that were used in the original

examination, in order that the results may be comparable. Other tests may be introduced as supplementary checks, as circumstances may dictate.

Prevention of subject disabilities

Every successful experience in detecting and correcting a pupil's subject disability serves the purpose of preventing more serious difficulty in the learning experience of that pupil. The sooner the disability is discovered and corrected, the greater the results in terms of prevention. The most important factor in prevention is the teacher who realizes that any pupil, regardless of his intelligence, is a potential disability case.

The goal of every teacher, administrator, and specialist in education should be to bring about conditions such that each pupil may progress normally in terms of his potentialities, maturity, and needs. Each experience in diagnosing and correcting a difficulty should serve three purposes: the immediate purpose of helping the pupil who is in trouble; making the teacher more sensitive to early symptoms of subject disability; and the ultimate purpose of making educators more competent in developing programs that will tend to prevent disabilities. As the medical profession is immediately concerned with diagnosis and cure and ultimately with a program of prevention, so the teaching profession must be concerned with both the diagnosis and correction of learning difficulties and the establishment of conditions that will tend to produce normal development and wholesome personalities.

Child guidance clinics

The teacher must realize that there are children whose problems are so complex that the assistance of specialists must be used to secure the best results. In the child guidance clinic, the cooperative services of specialists in the diagnostic study, guidance, and treatment of children with problems can be had. Such clinics usually are staffed by several kinds of specialists: psychiatric social workers, counselors, psychologists, and psychiatrists.

Summary

Difficulties in learning occur frequently at all grade levels and among pupils of high, as well as low, intelligence. Many difficulties may be prevented by the wise teacher. Others may be detected in the earlier stages and corrective measures used before serious conditions develop. Extreme cases of disability are easily recognized; less advanced cases too frequently escape attention.

Structual impairments and inadequate and incorrect learnings are primary causes of subject disabilities. Unfortunate emotional experiences frequently are associated with learning difficulties. In too many schools, uniform standards are maintained and expected of all pupils regardless of their capacities, interests, or needs. To teach successfully, the teacher must have insight into the causes of pupils' difficulties and the techniques by means of which he can detect, correct, and prevent subject disabilities.

In diagnosing and correcting difficulties, the teacher should secure as many significant facts as possible. The important data may be found in one or more of the following areas: physical condition, intelligence, aptitudes, achievements in subject matter, social and emotional experiences, work and study habits, interests, accomplishments outside the classroom, aspirations, attitudes, and home and school history.

The general principles that underlie the detection and correction of learning difficulties are also basic to prevention. The teacher must develop sensitivity to indications of learning difficulty. He should acquire the techniques of detecting and correcting learning difficulties. This experience, in turn, should become the basis for the progressive elimination of preventable causes of difficulty.

QUESTIONS AND EXERCISES
for discussion and study

1. What is the meaning of the word "disabilities"?
2. How may inadequate or incorrect experiences interfere with or block adequate responses? Make a list of such experiences.
3. Present some statistical evidence of the prevalence of subject disabilities in your state, city, county, or local school.

4. Why are unfortunate emotional experiences considered to be among the major causes of subject disabilities?
5. Can you illustrate from your own experience as a pupil how an unfortunate emotional set with reference to a subject may be developed?
6. How may an emotional set against reading occur?
7. How may an emotional set against reading be overcome?
8. What is the meaning of the phrase "readiness for reading"? In what way is readiness an important factor in learning?
9. Make a list of important causes of disabilities in the subject in which you are most interested.
10. Which of the causes listed in your answer to Question 9 are due to inadequate or incorrect experiences? Which are caused by structural impairments?
11. How can the curriculum be considered a major cause of subject disabilities?
12. Of the general principles of prevention, detection, and correction, select the five that you consider most important. Defend your selection and sequence.
13. Of the areas of investigation outlined under "*data to be secured,*" which ones might prove to be significant in the diagnosis of the following case? C.A. 13-6; M.A. 15-6; better than average achievement in everything except arithmetical computation—never having been given a grade above 40 per cent in arithmetic; so accurate in the handling of money that he was placed in charge of all school ticket sales, and never known to have made a mistake.
14. What tests and tools would you use to determine the specific nature of this student's learning difficulties?
15. What steps might have been taken to prevent his failure?
16. What steps might prove to be effective in helping him to overcome his difficulty?
17. What responsibility for the prevention, detection, and correction of subject disabilities must be assumed by administrative officers in order that pupils may have the best opportunity for successful learning experiences?

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V

EVALUATION AND MEASUREMENT

CHAPTER 22

Statistical processes in education

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THE NEED FOR QUANTIFYING the various aspects of educational phenomena has been most admirably expressed in other chapters of this volume. Although this need has always been implicit in education, it was not fully appreciated until the development of educational statistics made it possible to refine and improve educational measurements. The interaction of these two fields, educational statistics and educational measurements, has not only been mutually beneficial but it has been so essential that many professional educators consider them as one field. Although it is not the intention of the writer to engage in any debate, he will, for the sake of presentation, consider educational statistics as a separate field. Under this premise, educational statistics will be defined as the manipulation of data obtained as the result of educational measurement in order to arrive at certain objectives. Among the objectives of education that can be realized by statistical processes are: (1) organizing data for presentation; (2) describing group performance; (3) describing individual performance; (4) measuring relationship; (5) establishing model distributions; (6) drawing inferences; and (7) testing the significance of experimental results. We shall try to develop some of the concepts and techniques that are necessary to understand and appreciate the role played by statistical processes in education. If the reader is interested in further development, he is referred to the bibliography at the end of this chapter.

Organizing data for presentation

In order to appreciate the need for organizing data so that the people to whom they are presented will be able to gain information from them, let us examine some data that are numerically unordered. Table 22-1 presents the scores obtained from an objective test administered to a section of a course in educational psychology. The scores appear in the order in which they appear in the instructor's record book, that is, in alphabetical order of the students' names.

TABLE 22-1

Scores earned on an objective test in educational psychology

56	74	70	49	77
84	66	69	68	56
91	62	61	83	71
84	65	70	71	77
44	65	67	65	70
63	76	55	90	75
46	77	41	73	70
67	63	50	72	63
70	77	82	71	69
84	53	74	78	58

It will be noticed that not much information is immediately available from the data in their present form. A quick glance will inform us that all the scores are expressed in two digits, and that there are between 40 and 60 scores. Counting will reveal the exact number of scores. Close inspection and searching will reveal the highest and the lowest scores. However, additional information would be difficult to obtain without reorganization of these data.

Ranking is probably the simplest and easiest method of reorganizing data to obtain additional information. There are two basic techniques of ranking numerical data: (1) order of merit; and (2) tally. In the order of merit technique, one searches for the best score and places it at the head of the list, then the second best score, and so on until he has included the poorest score at the bottom of the list. Table 22-2 illustrates the order-of-merit technique.

TABLE 22-2

Scores from Table 22-1 reorganized into order of merit

91	77	71	67	58
90	77	70	66	56
84	76	70	65	56
84	75	70	65	55
84	74	70	65	53
83	74	70	63	50
82	73	69	63	49
78	72	69	63	46
77	71	68	62	44
77	71	67	61	41

A quick glance at Table 22-2 will immediately inform us that the highest score is 91; the lowest score, 41. With only slight effort one can determine the degree of replication of any score, the relative position of any score, and so on. It is still necessary to count in order to determine the exact number of scores.

In order to utilize the tally method of ranking the data it is necessary first to list all of the potential scores. Then one can take the scores individually in their order of appearance in the original listing (Table 22-1) and make a tally in the appropriate place. Table 22-3 illustrates the use of the tally method.

In addition to the information immediately available in the order-of-merit method, the tally method reveals the replication of scores. The

TABLE 22-3

Scores from Table 22-1 ranked by tally method

91 /	79	69 //	59	49 /
90 /	78 /	68 /	58 /	48
89	77 ////	67 //	57	47
88	76 /	66 /	56 //	46 /
87	75 /	65 ///	55 /	45
86	74	64	54	44 /
85	73 /	63 ///	53 /	43
84 ///	72 /	62 /	52	42
83 /	71 ///	61 /	51	41 /
82 /	70 卌	60	50 /	
81				
80				

choice between the two methods will depend almost entirely on the number of scores and the range of potential scores. The order-of-merit method lends itself to working with a few scores that may or may not be widely scattered. The tally method lends itself to working with many scores that are preferably scattered over a narrow range.

Both the order-of-merit and the tally methods are usually intermediate steps in ranking data. Ordinarily, the results from either of these methods are summarized into a frequency distribution. Table 22-4 illustrates the frequency distribution that would be obtained from either Table 22-2 or Table 22-3.

TABLE 22-4

Frequency distribution summarized from either Table 22-2 or Table 22-3

Score	*f*	*Score*	*f*
91	1	67	2
90	1	66	1
84	3	65	3
83	1	63	3
82	1	62	1
78	1	61	1
77	4	58	1
76	1	56	2
75	1	55	1
74	2	53	1
73	1	50	1
72	1	49	1
71	3	46	1
70	5	44	1
69	2	41	1
68	1	N =	50

In Table 22-4, it will be noticed that symbols are used to denote certain concepts. The lower-case f and the capital N are used to denote frequency and total number of cases, respectively. The use of such shorthand techniques is very common in all branches of statistical methods because common concepts can be expressed with reduced effort and space. The use of symbols also permits the expression of numerical relationships in equation form. In fact, our first equation is illustrated in Table 22-4.

$$N = \Sigma f \qquad \text{(Equation 1)}$$

In addition to the symbols f and N, this equation has a new, qualifying symbol, Σ—the Greek capital letter, sigma—which indicates that whatever follows will be summed together. The equation in words would read: "The total number of cases is equal to the summation of the frequencies."

Grouping is another method of organizing numerical data for presentation. Frequently, it is advisable to sacrifice precision for the purpose of obtaining clarity through concentration of the data. When data are grouped, they are arranged into relatively few (between 10 and 20) categories with uniform range. The organization of a system of uniform categories for the purpose of grouping data involves a compromise of simplicity, facilitation, clarity, conciseness, and precision. The range of the categories, usually referred to as the interval, is ordinarily a whole number. The intervals that have been found to be most useful are 5, 10, 25, 50, 100, and so on. Data that are grouped in these intervals are clearly understood, easily arranged, and relatively precise. When one knows the highest and lowest scores, the choice of interval size becomes an easy decision.

The presentation of data by grouping is usually done when presentation by ranking is found to be inadequate, confusing, and too detailed. However, the data do not have to be ranked in order to group them, because it sometimes is evident before ranking that there are too many different scores that cover a wide range, thereby making this type of presentation (ranking) too detailed and confusing. If the data are first ranked, then it is a simple matter to summarize the grouping; however, if the data are not ranked, one can group them by the tally

TABLE 22-5

Data from Table 22-1 grouped into intervals of five

Class Interval	*Tally*	*f*
90-94	//	2
85-89		0
80-84	卌	5
75-79	卌 //	7
70-74	卌 卌 //	12
65-69	卌 ////	9
60-64	卌	5
55-59	////	4
50-54	//	2
45-49	//	2
40-44	//	2
		N = 50

method. Table 22-5 illustrates the grouping of the data from Table 22-1.

It will be noticed that the data in Table 22-5 are grouped into intervals of five. The use of a larger interval would have overconcentrated the data with a consequent excessive loss of detail. The eleven categories illustrated below provide enough detail to show the general nature of how the scores are distributed.

Graphing is another method of organizing data for presentation. However, this method is beyond the scope of this chapter. The major graphing methods are histogram, polygon, and ogive.

Describing group performance

It is frequently desirable to consider a group as an entity in itself rather than a collection of individuals. In education, we find that the class, the student body, the faculty, and so on, are sometimes considered as such groups. A collection of descriptions for the individuals within the group does not ordinarily reveal much about the group itself. In order to describe the group itself, it is necessary to resort to description in terms of average, variability, skewness, and/or kurtosis.

Measures of average. The "average" layman will on the "average" define the term "average" with the definition for a specific kind of average. There are five kinds of average, three of which are commonly used in education. Average, as used here, is a single measure that is typical for a group. The five kinds of average are: (1) geometric mean; (2) harmonic mean; (3) arithmetic mean; (4) mode; and (5) median.

The *geometric mean* is useful for determining the average of measures in a geometric series, such as growth data. However, it is rarely used with educational data; consequently, it will not be developed here beyond a definition. The geometric mean is defined as the Nth root of the product of the N measures.

The *harmonic mean* is another average that is rarely used with educational data. It is useful for determining the average of rates. It is defined in terms of its reciprocal and another measure of average: The reciprocal of the harmonic mean is the arithmetic mean of the reciprocals of the measures involved.

The *arithmetic mean* is the measure of average that most people identify as "the average." Its working definition is: "The sum of the measures divided by the number of measures." By introducing the symbol M to represent the arithmetic mean, and the symbol X to represent the individual measures, the working definition can be written in equation form as given in Equation 2.

$$M = \frac{\Sigma X}{N} \qquad \text{(Equation 2)}$$

When the data presented in Table 22-1 are subjected to this equation, it is found that the arithmetic mean is 3,412 divided by 50, or 68.24. This provides the best single description of the group performance. Unless there is a special reason for using another measure of average, the arithmetic mean will provide the most meaningful average.

The *mode* is another measure of average. It is the only measure that can be used with nonquantitative data. Another of its major advantages is the ease with which it can be determined. Because it is determined entirely on the frequency of replication, it is immediately available when the data, either quantitative or nonquantitative, are arranged in a frequency distribution. For the data in Table 22-4, it is evident that the mode is 70, since this is the score with the largest frequency. The mode can also be estimated from the frequency distribution of grouped data. The mid-point of the class interval containing the largest frequency provides a mode that is sometimes a better measure of average than the mode from ungrouped data. The estimated mode from the grouped data in Table 22-5 is 72.

Another characteristic of the mode that sometimes reveals additional information concerning group performance is the possibility for a distribution to have more than one mode. Whenever this happens, one should suspect that the distribution is formed by a mixture of two or more groups rather than from a single group. A distribution of body weights for a coeducational high-school or college class would demonstrate this characteristic.

In summarization, the circumstances under which the mode would be the preferred measure of average are: (1) The data are nonquantitative; (2) the easiest and most quickly determined average is desired; or (3) the singularity or multiplicity of group formation is to be investigated.

The *median* is another measure of average that is very useful in the field of education. It is defined as that point in a distribution above and below which exactly 50 per cent of the measures are to be found. Its exact determination usually involves interpolation into a score that is beyond the scope of this presentation. However, the mid-score estimate of the median is adequate for most educational needs.

When N is an odd number, the mid-score estimate of the median is the middle score in the distribution; when N is an even number, the mid-score estimate is the average of the two middle scores. For the illustrative data as presented in Table 22-4, since N is 50, the average of the 25th and 26th scores from either end of the distribution would be the mid-score estimate of the median. Since both of these scores are 70. the estimate would also be 70.

The median is a more precise measure of average than the mode, because the position of each measure contributes directly to its determination, whereas the contribution is indirect in the case of the mode. However, the median tends to be less precise than the arithmetic mean, because the size of each measure has no direct effect on the median as is the case with the mean. The median would be more precise than the mean in those instances when an extreme score at either end of the distribution would distort the mean.

In summary, the median is the preferred measure of average when: (1) Moderate precision and ease of determination are desired; (2) an extreme measure would distort the mean; (3) an open-end or truncated distribution would distort the mean; or (4) there is doubt concerning the precision of the individual measures.

Other point values. It is sometimes desirable to supplement the median in describing group performance by reporting other point values in the distribution. The point values that are most frequently used for this purpose in the field of education are quartiles, deciles, and centiles. Score estimates are easily determined for each of these points.

Quartiles are the three points that divide a distribution into four equal portions. The symbol for quartile is the capital letter Q with the appropriate subscript: Q_1 is the lower quartile; Q_2, the middle quartile or the median; Q_3, the upper quartile. The four portions of the distribution are properly called quarters (not quartiles). For the data illustrated in Table 22-4, the 13th score from the bottom of the distribution is the score estimate for Q_1; the 13th score from the top, the score estimate for Q_3; the median (Md) is Q_2. These values are: $Q_1=63$; $Q_3=76$; $Q_2=Md=70$.

Deciles are the nine points that divide a distribution into ten equal portions. The symbol for decile is the capital letter D with the appropriate subscript: D_1 is the first or lowest decile; D_2, the second decile; and so on. The score estimates from the illustrative data would be: D_1, the average of the 5th and 6th scores from the bottom; D_2, the average of the 10th and 11th scores; and so on.

Centiles are the ninety-nine points that divide a distribution into one hundred equal portions. They are sometimes called percentiles because of their similarity to percentile ranks, which will be discussed later. The symbol for centile is the capital letter C with the appropriate subscript. C_{50} is the median; C_{10}, the first decile; C_{90}, the ninth decile; C_{25}, the lower quartile; and so on. Centiles should be used only when N is quite large. They provide useful reference points in education when many similar groups are combined into a much larger group. The pooling of the scores earned by all the fourth-grade students in a large city would be an example of this.

Measures of variability. Although an average provides the best single description of group performance, it is sometimes inadequate. Two or more groups with equal average performance do not necessarily have equal performances. It is possible for homogeneous and heterogeneous groups to have equal averages. The use of other point values would indirectly provide sufficient information to distinguish among groups with equal averages, but it would be better to have a single measure of variability. The measures of variability that seem to be most useful in education are full range, interdecile range, interquartile range, quartile deviation, and standard deviation.

Range measures of variability are useful indicators of the spread of measures; however, they are limited because they are based on only two scores in a distribution. The *full range* is the distance from the lowest to the highest score. It is the least precise range because it is based on the two least reliable measures in the distribution, the two extreme scores. However, it is the easiest to determine, which makes it very useful when precision is not a factor in the choice of a measure of variability.

The *interdecile range* is more precise than the full range because it eliminates the unreliable 10 per cent of a distribution at both extremes. It is defined as the difference between D_1 and D_9, which is the range over the middle 80 per cent of a distribution. This relatively new measure of variability is becoming more popular.

The *interquartile range*, which measures the range over the middle

50 per cent of a distribution, is another measure of variability that has been very useful. It is determined by subtracting Q_1 from Q_3. For the illustrative data, the interquartile range is about 13. The information that the middle half of the scores covers a range of 13 points will provide supplementary description of group performance when the median is used as the average. Although there is nothing to prevent the use of this or any measure of variability with any measures of average, the fact that both the interquartile range and the median are based on point values tend to make them associated measures.

The *quartile deviation* represents an approach to the measurement of variability different from the range measures. A deviation is the difference between a measure and some reference point. Since measures of variability are intended to supplement the information supplied by measures of average, then the logical reference point would be a measure of average. The quartile deviation is defined as the average deviation of the upper and lower quartiles from the median. Since the sum of these two deviations is equal to the interquartile range, the average of the two deviations will then be equal to one half of the interquartile range. If the capital letter Q with no subscript is used as the symbol for quartile deviation, then the equation for this measure will be as presented in Equation 3.

$$Q = \frac{Q_3 - Q_1}{2} \qquad \text{(Equation 3)}$$

The median plus and minus the quartile deviation will include approximately 50 per cent of the measures in the distribution. For the illustrative data, this would mean that about half of the scores should be within the limits 70 ± 6.50. Upon examination, it is found that 23 scores, or 46 per cent of the distribution, are within these limits.

The *standard deviation* is the measure of variability that is based on the size of every measure in the distribution. The point of reference used for the score deviation is the arithmetic mean. The score deviation, symbolized by the lower-case letter x, is the mean subtracted from the score. Since this causes scores less than the mean to have negative values while those above the mean have positive values, the sum, and consequently the average of these score deviations, will always equal zero. In order to overcome this barrier, the deviations are squared (all squares are positive) in order to arrive at some meaningful measure of variability. The average of the deviations squared is, however, in a different magnitude from the original measures. Consequently, it is reconverted to the original magnitude by extracting the square root, which provides a measure of variability that is truly the "standard" for the deviations. By using the symbol *SD* to represent the standard deviation, the basic relationship is expressed in Equation 4.

$$SD = \sqrt{\frac{\Sigma x^2}{N}} \qquad \text{(Equation 4)}$$

The use of Equation 4 would become very tedious and burdensome when the mean is not a whole number. This difficulty can be overcome by using an equivalent equation that uses the scores themselves rather than the deviations. An approach to the determination of the standard deviation from the raw scores is presented in Equation 5.

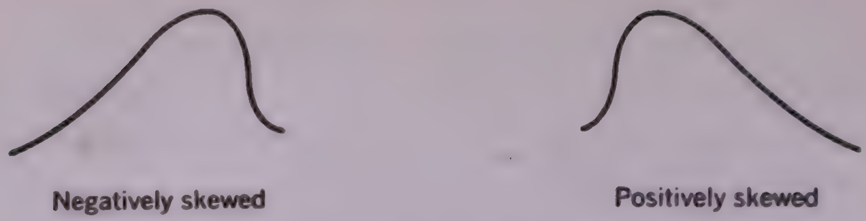
$$SD = \sqrt{\frac{\Sigma X^2}{N} - \mathrm{M}^2} \qquad \text{(Equation 5)}$$

For the data presented in Table 22-1, the use of Equation 5 yields as the standard deviation, 11.27. Since the mean plus and minus the standard deviation should include about two-thirds of the distribution, we would expect about two-thirds of the distribution between the limits 68.24 ± 11.27 (56.97 through 79.51). Upon examination, we find 34 scores, or 68 per cent of the distribution, within these limits.

In summary, measures of variability supplement the information provided by measures of average. The full range provides a measure of variability that is easily and quickly determined for use with any measure of average. The interdecile range works well with the mode or median. The interquartile range or the quartile deviation are ideal measures to use in conjunction with the median. The standard deviation is the preferred measure to use in conjunction with the arithmetic mean.

Skewness and kurtosis. In most instances, the use of a measure of variability in conjunction with a measure of average provides an adequate description of group performance. However, in order to provide a complete description of group performance, additional information concerning skewness and kurtosis are needed.

Skewness refers to the lack of symmetry in a distribution of measures. A symmetrical distribution has no skewness. A distribution that is asymmetrical will be skewed either positively or negatively. Graphic representations as presented in Fig. 22-1 illustrate this phenomenon.



Negatively skewed

Positively skewed

Fig. 22-1. Illustration of skewness.

If we follow the mathematical convention that negative is toward the left side of a graph and positive to the right, it will be noticed that skewness is in the direction of the "tail" of the distribution. The terms "left" and "negative" are used synonymously with reference to skewness; "right" and "positive" for the opposite direction.

Comparison of the mean and median will indicate the direction of skewness. When skewness is absent, the mean and median are equal. When skewness is present, it will be in the direction of the arithmetic mean. For the illustrative data, since the median is 70 and the mean is 68.24, the data are slightly skewed to the left, or in a negative direction.

A comparison of the distances of the upper and lower quartiles from the median will also indicate the direction of skewness. Skewness will be in the direction of the greater distance. With Q_1 equal to 63, Q_3 equal to 76, and Md equal to 70 for the illustrative data, we once again have demonstrated that the data are slightly skewed to the left.

Kurtosis refers to the homogeneity or heterogeneity of the measures within a distribution. In a homogeneous distribution, the measures will tend to be heavily concentrated about the measures of average. Homogeneous distributions are called leptokurtic. Heterogeneous distributions, called platykurtic, will have widely dispersed measures with little or no concentration. For those distributions that have a moderate concentration about the average and a gradual tapering toward both extremes, we use the description "mesokurtic," or normal. The illustrative data would be classified as mesokurtic.

Describing individual performance

In education there are few absolute measurements such as height and weight. Most educational measurements are indirect inferences based on sample performances in which the characteristic being measured is utilized. The strength or tension of the measuring instrument varies among instruments designed to measure the same characteristic. Consequently, the obtained measurement for an individual is as much a measurement of the instrument's strength as it is a measurement of the individual's strength. Some system of calibration is necessary to interpret properly the score obtained from an educational measuring instrument. The usual system of calibrating such instruments involves comparing an individual's performance with the performance of a group of his peers. The basic methods used in education are age equivalents, grade placement, percentile rank, and standard scoring.

Age equivalents are average performances of groups that are separated according to age level. Mental age and educational age are examples of describing individual performance by using age equivalents. The determination of the age equivalent may be by scaling (assigning tasks that can be performed by the average individual at a given age level) or by establishing norms (the average score of a group with a common age level). If the quality being measured is intelligence, the age equivalent is called mental age; if academic achievement, educational age.

Age equivalents are frequently converted to quotients by comparison with the chronological age of the individual. Mental age is converted into an intelligence quotient (IQ), and educational age into an educational quotient (EQ). These methods of describing individual performance are very useful for individuals in elementary school. However, their use is limited in the case of individuals in secondary or college-level schools. Many of the traditional measurements of intellectual development tend to level off at about the chronological age of 16, thereby limiting the use of mental age. The diversification of the curriculum in high school and college limits the use of educational age at these levels. Probably the major limitation on the use of age equivalents is that the quality being measured must still be in a developmental stage.

Grade placement is another method of describing individual performance. Very similar to age equivalents, it is used primarily as a means of describing individual performance in academic achievement. The norms are established on the basis of average performance of groups divided according to academic levels. It is a very useful description at the elementary-school level. However, with the diversification of the curriculum and the mixing of different academic levels in the same courses in high school and college, its use is limited at these levels.

Percentile rank is a third method of describing individual performance. It is very useful for those qualities that are not directly related to age or academic level. It reveals what proportion of one's peers are exceeded by the individual in a specific performance. It is used with many aptitude tests, intelligence tests for adults, achievement tests in specific areas, and so on. It also provides a means for making inspectional comparisons among many areas for the same individual. One of the major advantages of percentile rank is the ease of interpretation to laymen. The major disadvantage is that percentile ranks are not algebraic (the differenec between the percentile ranks of 91 and 92 is greater than the difference between 51 and 52) and therefore should not be used to compute algebraic measures such as arithmetic means, standard deviations, and product-moment coefficients of correlation.

Standard scoring is a method of describing individual performance that is based on a constant mean and standard deviation. It is also algebraic, thereby lending itself to further statistical manipulation. One can even average standard scores into a composite standard score. The basic standard score is called sigma score. It is defined as the number of standard deviations an individual measure is from the mean of the group. By using the symbol lower-case z to represent the sigma score, the definition can be stated in equation form as in Equation 6.

$$z = \frac{X - M}{SD} \qquad \text{(Equation 6)}$$

For the data illustrated in Table 22-4, this equation would give a sigma score of +2.0 for the test score 91; sigma score +1.9 for 90; sigma score +1.4 for 84; and so on, until a sigma score of −3.3 is determined for the test score 41.

Sigma scores can be determined for large groups or for small groups. This is an ideal system for the average classroom test. Those scores that are below the mean will be negative, whereas those above the mean will be positive. Sigma scores can also be converted into close approximations of the widely used T-scores, by first multiplying the sigma score by ten and then adding fifty to the product. This relationship is expressed in Equation 7.

$$T = 10z + 50 \qquad \text{(Equation 7)}$$

T-scores are standard scores that have a mean of 50 and a standard deviation of 10. Interpretation is in terms of the number of standard deviations above or below the mean. A T-score of 35 would be 1½ SD's below the mean; 70, 2 *SD*'s above the mean; and so on. They lend themselves to further statistical manipulation, and for this reason are preferred by educational research workers.

Measuring relationship

It has been known for many centuries that certain personal characteristics are related to each other. However, such relationships are not as exact as that between the diameter and circumference of a circle, or the hypotenuse and legs of a right-angle triangle. It was not until Sir Francis Galton discovered the phenomenon of regression late in the nineteenth century that it was possible to make a prediction of one characteristic from a related characteristic. Karl Pearson, an assistant to Galton, derived a coefficient describing this relationship.

Another British statistician, Charles E. Spearman, derived an approximation of Pearson's coefficient by using the rank order of both characteristics. Since this approximation is reasonably exact and much easier to understand, it will be used here to develop the concept of correlation.

The coefficient of correlation is a mathematical ratio that has minus one and plus one as its limits. Coefficients that approach plus one indicate direct relationship; coefficients that are negative and approach minus one indicate inverse relationship; coefficients that approach zero indicate an absence of relationship. When the relationship is perfect direct ($r = +1.0$), each individual would have the same rank in both characteristics. When the relationship is perfect inverse ($r = -1.0$), the ranks would be in exact reversed order. Spearman's coefficient is determined by subtracting an alienation factor (based on the differences in rank for each individual) from the coefficient for perfect direct relationship. The process is given in Equation 8, in which the symbol *D* is used to represent the differences in rank, and *r*, the coefficient of correlation.

$$r = 1 - \frac{6\Sigma D^2}{N(N^2-1)} \qquad \text{(Equation 8)}$$

When the ranks are in exact reversed order, the alienation factor is found to be 2, which gives: $r = -1.0$, as it should. The reader is asked to demonstrate this fact for himself.

The use of this method is illustrated in Table 22-6. The data are scores earned on an examination in general psychology (X) and an examination in educational psychology (Y).

In the assignment of ranks for Table 22-6, it will be noticed that, in variable X, students c and k tied for ranks 2 and 3, whereas students g and l tied for ranks 13 and 14. Whenever this happens, the average of the tied ranks is assigned to each individual involved.

The alienation factor in Table 22-6 was found to be .12, thereby giving .88 as the coefficient of correlation. The interpretation of coefficients of correlation is indirect in that they are regression factors for sigma scores. When measures have exact relationship (such as the circumference and diameter of a circle) it is possible to determine one measure from the other measure. When measures have only relative relationship, it is possible only to *predict* one measure from the other. The best prediction of relatively related measures is in terms of sigma scores and the regression factor. Equations 9 and 10 express this prediction. The symbol $\bar{z}$ is used to represent the predicted sigma score.

TABLE 22-6

Illustration of Spearman's Coefficient of Correlation

Student	*X-score*	*Y-score*	*X-rank*	*Y-rank*	*D*	D^2
a	142	332	4	2	2	4
b	139	312	6	5	1	1
c	148	305	2.5	7	−4.5	20.25
d	127	297	10	9	1	1
e	121	284	11	12	−1	1
f	120	296	12	10	2	4
g	118	244	13.5	14	−0.5	0.25
h	135	313	8	4	4	16
i	130	295	9	11	−2	4
j	157	334	1	1	0	0
k	148	308	2.5	6	−3.5	12.25
l	118	262	13.5	13	0.5	0.25
m	140	321	5	3	2	4
n	114	239	15	15	0	0
o	138	302	7	8	−1	1

$\Sigma D^2 = 69.00$

$$r = 1 - \frac{6\Sigma D^2}{N(N^2-1)} \qquad = 1 - \frac{414}{3360}$$

$$= 1 - \frac{6 \times 69}{15(225-1)} \qquad = 1 - .12 = .88$$

$$\bar{z}_y = rz_x \qquad \text{(Equation 9)}$$

$$\bar{z}_x = rz_y \qquad \text{(Equation 10)}$$

Since r is usually less than 1.0, the predicted sigma score will usually be smaller than the sigma score used as the predictor. This phenomenon is called regression because the predicted measure regressed toward the mean. By using Equation 9, it is found that -1.32 is the predicted sigma score for educational psychology when the sigma score is -1.50 for general psychology. One should be careful to make only meaningful predictions. Since, in the normal course of academic events, general psychology precedes educational psychology, it would be meaningless to predict the general psychology sigma score from the educational psychology sigma score.

Measuring relationship has many practical applications in education. The relationship between a measure of aptitude and a measure of success makes it possible to predict with reasonable accuracy the chances an individual has of succeeding in a specific area. If the relationship is known between performances in sequential courses of study, it is possible to predict performance in the courses that come later in the sequence. In the example given in Table 22-6, it would be possible to predict the score on the educational psychology examination from the score earned on the general psychology examination, provided all circumstances remained similar (same teachers, same exams, same methods of instruction, and so on).

Educational research possibilities

Educational statistics makes many contributions to educational research in addition to providing methods of description. This is not to infer that statistical processes will provide a panacea for educational research, nor that all or even most educational research should be statistical. There are many possibilities for educational research, however, that are created by statistical processes. Although these advanced statistical concepts and techniques are beyond the scope of this presentation, these possibilities should be mentioned and briefly discussed for the benefit of the reader who may be interested in pursuing the study of educational statistics.

Probably the most frequent contribution is the establishment of model distributions for purposes of comparison with actual distributions. The curve of the normal probability function is widely used as a model for distribution of measures of intelligence and achievement. Unfortunately, this normal probability curve is frequently used when another model might be more applicable. One should be certain that the characteristic under consideration tends to be distributed normally before using the normal probability curve as a model. Another model that shows promise as a model for educational data such as the distribution of scores on a mastery test or other greatly skewed distributions is the Poisson distribution. The equal probability or rectangular distribution is another frequently used model for such things as the proportion of left-handed pupils in each class.

It is frequently possible to infer the description of a population from the description of a sample drawn from that population. It should be obvious that measures derived from a sample will be subject to error with regard to the equivalent measures for the population. Fortunately, it is possible to estimate the standard deviation of the distribution of all the potential measures that could be determined from the potential samples in the population. Such a distribution is called a sampling distribution and its standard deviation is called a standard error. Since most sampling distributions tend to follow the normal probability function or the closely related Student's distribution, it is possible to determine the probability of a sample measure deviating from the population measure. The population measure is seldom, if ever, known; however, there is sometimes a hypothetical value, such as the mean *IQ* equals 100. In those instances in which there is no hypothetical value, it is possible to establish limits within which the population measure should be found for a given level of probability. These limits are called limits of confidence, and they vary according to the level of probability desired. In those instances in which there is a hypothetical population measure, it is possible to determine the probability of a chance sample measure deviating the observed amount or more.

It is sometimes desirable to know whether or not chance is a reasonable explanation for an observed difference in similar measures derived from two samples. For example: Does chance difference explain the difference in group performance when two groups are taught the same unit by different methods? Through an algebraic combination of the two measures and a combination of their standard errors, it is possible to determine the probability of chance explaining the observed difference if the hypothetical difference is zero. Such a process is called a test of significance. If the probability of chance explaining the difference is remote (less than 1 per cent), the difference must be explained on another basis, such as different experimental treatments.

The test of significance for simultaneous deviation from hypothetical population measures (such as in a frequency distribution) is called "chi-square." Although this test of significance can be used with any multiple probability situation, it is used most often with frequency distributions. The hypothetical frequency distributions are usually established on the basis of the normal distribution, equal distribution, or proportionate distribution (contingency).

Through complex analysis it is possible to establish an equation of prediction (called multiple regression) for a criterion variable, such as grade point average, on the basis of many variables related to the criterion, such as aptitude test scores. Through careful design and a consideration of chance factors, it is possible to select the best predictive variables to use in multiple regression. This process is called test selection and shows much promise in academic advisement.

By carefully designing an experiment so that the data can be arranged into certain patterns, it is possible, through analysis of variance or analysis of covariance, to attribute the variability in the experiment to different sources and to test each source for significance. It is also possible to compare many samples simultaneously through this approach. For example, it is possible to compare several methods of teaching a given unit at the same time that the difference in performance for levels of intelligence are being determined. In fact, it can be determined if interaction of method and level of intelligence is present, that is, if different methods are better for different levels of intelligence.

Probably the most complex statistical analysis used in education is factor analysis. By means of this analysis it is possible to separate a complex characteristic (such as intelligence) into its component parts. Thurstone's work with primary mental abilities is an example of factor analysis.

QUESTIONS AND EXERCISES

for discussion and study

Data I. A class in educational psychology earned the following scores on their final examination. The scores are listed according to the alphabetical order of the students' names.

74	68	81	96	79
97	77	84	80	72
66	81	67	93	87
89	90	74	96	94
83	82	70	60	87
67	81	78	89	82
78	78	88	69	86
90	92	74	77	58

1 Rank the scores into a frequency distribution.

2 Group the scores into intervals of five.

3 Describe the group performance in terms of median and quartile deviation.

4 Describe the group performance in terms of arithmetic mean and standard deviation.

5 Determine the sigma scores for any five individuals.

6 Are the data skewed? If so, in which direction?

Data II. A class in educational statistics earned the following scores on their final examination. The score earned by each student on the final examination in educational psychology is given in another column.

Student	*Educational Statistics Test*	*Educational Psychology Test*
a	92	91
b	69	73
c	85	86
d	89	89
e	75	80
f	88	89
g	79	84
h	87	89
i	86	92
j	80	83
k	90	90
l	95	93
m	76	78
n	84	87
o	81	82

7 Determine the mean and standard deviation for the test scores in educational statistics. In educational psychology.

8 Determine the coefficient of correlation between the two sets of test scores.

9 In which direction should predictions be made? Why?

10 Predict the scores for the 15 students in the direction indicated in answer 9 above. How do they compare with the scores actually earned?

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for further reading

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Tate, M. W., *Statistics in Education.* New York: The Macmillan Company, 1955. A comprehensive and understandable book, this should be a classic someday.

Walker, H. M., "Statistical Understandings Every Teacher Needs," *Teachers College Record,* XLIX (1948), 452-457. Summarization of the critical needs of teachers by one of the leading authorities in the field.

CHAPTER 23

Discovering the child's potentialities: intelligence and aptitudes

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MEASUREMENT OF INTELLIGENCE AND APTITUDE continues to present a challenge to educators and psychologists. The challenge relates to the validity of the measurements and to the possibility of discovering not only the general mental ability but also the specific aptitudes and potentialities of the child. In effective guidance, the discovery and nurture of such potentialities are basic concerns. Although questions continue to be raised concerning the nature and scope of intelligence, there exists a substantial body of reliable literature based on careful research that makes the questions less controversial. The widespread use of standard tests has provided crucial data that contribute to clearer concepts of intelligence. Standard testing arose, perhaps, from laboratory investigations and observations that demonstrated the enormous range of individual differences. In Germany, scientists directed attention to the wide variation in abilities and functions. The recency of this work is revealed by the fact that the first psychological laboratory in Germany was established in the latter part of the nineteenth century, in 1879 by Professor Wundt in Leipzig.

Historical background

At about the same time, investigations related to individual differences were being made in England. Among the many contributors to the movement, Sir Francis Galton was perhaps the most important Englishman. Although Galton did not develop an intelligence test, he made many suggestions directly relevant to this enterprise. He observed that such a test *could* be made and suggested that, if it were, it would doubtless show that individuals distribute themselves widely and by degrees according to a statistical pattern or curve. Some persons would display extraordinary brightness; others would demonstrate very little ability; whereas most would tend to cluster rather closely around the average tendency. During this period, tests were being developed in several countries. In America as early as 1890, J. McK. Cattell published a volume entitled *Mental Tests and Measurements*, in which he described single tests of separate factors or abilities such as sensation, reaction time, speed of movement, and so forth. In much of this pioneer work, there was implied the belief that intelligent behavior was the product or sum of the related activity of separate items that could be profitably studied and accurately measured in isolation.

Alfred Binet was led to reject this hypothesis after considerable experimentation, for his studies of memory, attention, and adaptation seemed to indicate that these factors operated in inseparable combinations; he discovered that the unity and character of the whole pattern was endangered or destroyed by attempts to disentangle and measure each component separately. He asserted that intelligence could be most reliably observed in activities that called for the combined activity of the various factors. Accordingly, he sought to assemble an array of activities that represented the typical reactions of children and youths. Working with the French physician Simon, he brought together such activities from reports of parents and from observation of the everyday experience of boys and girls. Finally, after considerable experimentation, the data were classified as standards of performance for each age from three to fourteen. An *age* expression of ability emerged; this age scale was published in 1908.[1] Thus it became possible to state crudely a child's intelligence level. If a child of twelve (or of any other age) responded to these tests in a manner typical of the seven-year-old child, he was judged to be seven years of age mentally.[2]

The Binet tests were received in various ways: some persons objected to the concepts underlying them, whereas others endorsed them enthusiastically. In general, psychologists were skeptical. However, the method was adopted by many workers. H. H. Goddard brought the tests to America, published a revision as early as 1911, and soon demonstrated the value of mental tests in school work.[3] Although these early workers were significant in giving impetus and direction to intelligence testing, it was L. M. Terman who demonstrated best the possibilities inherent in the testing movement.

In 1916, the Stanford Revision of the Binet-Simon Tests appeared; Terman and his colleagues had spent five years in its construction and standardization.[4] Although Terman employed the technique developed by Binet, he made several important contributions and additions. He refined the method, utilized the mental age concept, and applied Stern's proposal in calculating IQ's.[5] Furthermore, he improved the reliability and validity of the test, and he added several new items, for example, the vocabulary and the fable tests.

This revision appeared in 1916. It was widely used in our schools, and was generally accorded first rank as an instrument in child study. L. M. Terman continued his experimentation with this approach. In 1937, in collaboration with Maud M. Merrill, he published another revision.[6] Although the method used in making this revision was similar to that employed in developing the 1916 test, this revision constitutes a marked improvement. Significant features of the new examination include: extension of the scale to include tests for children as young as two years of age, the inclusion of more reliable tests for age levels three to five, the improvement and extension of the adult-level tests, and the development of a second form, which makes it possible to offset practice effects in retesting children.

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[1] Goodenough has pointed out that, in 1887, Chaille published standards for each month of the first year of life, and additional standards up to 36 months. Consult the following: F. L. Goodenough, *Mental Testing* (New York: Rinehart & Company, Inc., 1949), pp. 50-51; and S. Chaille, "Infants, Their Chronological Progress," *New Orleans Medical and Surgical Journal*, XIV (1887), 893-912.

[2] A. Binet and T. Simon, "Le developpement de l'intelligence chez les enfants, "*L'Annee Psychologique*, XIV (1908), 1-94; and A. Binet, "Nouvelles recherches sur la mesure du niveau intellectuel chez les enfants d'école," *L'Annee Psychologique*, XVII (1911), 145-201.

[3] H. H. Goddard, "A Revision of the Binet Scale," *Vineland Training School Bulletin*, VIII (1911), 56-62.

[4] This revision was accompanied by Terman's *Measurement of Intelligence* (Boston: Houghton Mifflin Company, 1916), which gave a complete description of the test as well as directions for administering and scoring it.

[5] The IQ is calculated by dividing a child's mental age in months by his chronological age. An average child of exactly 6 years of age will be credited with 6 years of mental age. Thus his IQ will be $\frac{72}{72}$ or 1.00. In general practice, decimals are eliminated; the child's IQ is said to be 100. See W. Stern, *Psychological Methods of Testing Intelligence* (Baltimore: Warwick & York, Inc., 1914).

What is intelligence?

During the period of the rapid expansion of the intelligence testing movement, many theories and definitions of intelligence were advanced. So contradictory were the various claims that a group of psychologists prepared a symposium, in 1921, attempting to clarify the situation. At that time, E. L. Thorndike stated that intelligence is demonstrable in the ability of the individual to make "good responses from the standpoint of truth or fact"; others emphasized the ability to adjust adequately to new situations; and still others stressed the ability to learn. Terman asserted that an individual "is intelligent in proportion to his ability to carry on abstract thinking," and thus implicitly differentiated the capacity to deal with concrete or mechanical situations and the ability to handle symbols, to see relationships, and to solve problems. Thorndike, too, felt that it was necessary to differentiate kinds of intelligence, such as abstract, mechanical, or social. From these considerations of intelligence, and many other treatments as well, one might conclude that intelligence is reflected by the individual's success in adapting himself to the varied demands of modern life.

Many psychologists, observing positive relationships between different types of performance, have concluded that intelligence is a general ability. In investigating this concept, Spearman worked patiently for more than three decades.[7] In his brilliant work, he sought to analyze intelligence. He believed that two integers are fundamental in any consideration of the abilities of man. The first is *g*, a factor common to some degree in all tasks; the second, *s*, is the specific phase, characteristic in particular activities or situations.[8] Thorndike was led, after several decades of experimentation, to redefine intelligence, and to state that level, range, area, and speed are essential characteristics. This concept was applied in the tests that he developed. In *Measurement of Intelligence* he reports the construction of four tests, commonly known as the C A V D scales.[9] These include parts requiring: the completion of sentences (C), arithmetic (A), vocabulary (V), and compliance with directions (D). Although Spearman and Thorndike have had widespread influence upon test construction, Binet and Terman appear to have exercised the dominant influence in the development of abstract or verbal tests of intelligence.

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[6] L. M. Terman and M. M. Merrill, *Measuring Intelligence* (Boston: Houghton Mifflin Company, 1937).

[7] C. Spearman, *Abilities of Man* (New York: The Macmillan Company, 1927).

[8] C. Spearman, *Nature of Intelligence and the Principles of Cognition* (London: Macmillan & Co., Ltd., 1923).

For some children the verbal test is unsuitable. Another type of test—the performance—was devised for use with the deaf and with children deficient in language or speech acquisitions. Pintner and Paterson, in 1917, presented the first really practical scale, well-standardized and carefully assembled, which required little "conventional" language either in presentation or in response.[10] The performances of the child are converted into mental ages; a median mental age is then calculated. The results obtained by use of these scales show positive relationships with those derived from the verbal or abstract tests. Many other performance scales have been constructed. In two early surveys, the Porteus Maze Scale and the Arthur Performance Scale were found to be widely utilized in American psychological and educational clinics.[11] The performance scales prove valuable supplements to the Binet; they are unique in their appeal to children, who generally exhibit delight in taking them. Many other intelligence tests have been developed for special groups; of significance is the work of Kuhlmann, who has developed an individual test for measuring the intelligence of very young children.[12] Kuhlmann extended the Binet test downward, providing tests and standards for children as young as three months of age. Several students have attempted to devise more comprehensive standards for young children. Arnold Gesell has created developmental schedules for children of ages *below* three.[13] These comprehensive standards have led to penetrating descriptions of the abilities and behavior of very young children.[14]

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[9] E. L. Thorndike, *et al.*, *Measurement of Intelligence* (New York: Columbia University, Teachers College, Bureau of Publications, 1926).

[10] R. Pintner and D. Paterson, *A Scale of Performance Tests* (New York: Appleton-Century-Crofts, Inc., 1917).

[11] P. A. Witty and V. Theman, "Psycho-Educational Clinic," *Journal of Applied Psychology*, XVIII, No. 3 (1934), 369-392; and C. Town, *et al.*, Report of Committee of Clinical Section of the American Psychological Association," *Psychological Clinic*, XXIII, Nos. 1-2 (1935), 1-140. A Revised Form of the Arthur Performance Scale appeared in 1947. It is primarily an alternate Form for the earlier Scale. The Scale continues to be widely used.

[12] F. Kuhlmann, "Revision of the Binet-Simon System for Measuring the Intelligence of Children," *Journal of Psycho-Asthenics, Monograph Supplement*, I (1912).

Most intelligence tests have been devised primarily for use with children and youths. To meet the need for an adult test, David Wechsler, in 1944, presented the Wechsler-Bellevue Intelligence Test: a Semi-Performance Scale to measure the ability of persons from ten to sixty years of age. Wechsler is cautious in interpreting mental ages, since he believes that intelligence tests measure "different portions" of intelligence at different ages; a mental age of twelve years for a child of twelve is not the equivalent of a mental age of twelve years for an adult thirty years of age.[15]

The Wechsler-Bellevue Intelligence Test has been widely used in clinics. Examiners report that it provides a comprehensive measure of adult ability and that it makes possible the observation and appraisal of important character traits that are revealed by subjects throughout the examination. The test has been criticized because of the limited group employed in its standardization, the use of the term "intelligence quotient" to designate the index derived from the test, the nature of some of the more difficult test items, and incomplete reports on validity and reliability.[16] The Revision of the test attempts to meet such criticisms by broadening the sample population and improving the subtests. The Wechsler-Bellevue Intelligence Test is rather generally conceded to be the most useful individual intelligence test for adults.

In 1949, the Wechsler Intelligence Scale for Children appeared, distinct from the earlier test, and standardized independently. It may be used with subjects whose ages range from five years to adolescence. The child and adult tests overlap; either can be used with adolescents. The Wechsler Intelligence Scale for Children consists of five verbal and five nonverbal tests with two alternative tests, one verbal and one nonverbal. Three scores and three quotients are obtained.

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[13] A. Gesell, *Mental Growth of the Pre-School Child* (New York: The Macmillan Company, 1925). See also A. Gesell and F. L. Ilg, *Child Development* (New York: Harper & Brothers, 1949).

[14] A. Gesell, *et al., An Atlas of Infant Behavior* (2 vols.; New Haven: Yale University Press, 1934).

[15] D. Wechsler, *The Measurement of Adult Intelligence* (3rd ed.; Baltimore: Williams & Wilkins Company, 1944), p. 12. A revision of the Wechsler adult test appeared in 1955: The *Wechsler Adult Intelligence Scale* (New York: The Psychological Corporation, 1955).

[16] J. L. Mursell, *The Measurement of Intelligence* (New York: Longmans, Green & Company, Inc., 1949), p. 133; and L. J. Cronbach, *Essentials of Psychological Testing* (New York: Harper & Brothers, 1949), p. 158.

The Wechsler Intelligence Scale for Children has been rather widely used and its acceptance is increasing. However, until this scale has been more widely studied, the Terman-Merrill Revision of the Binet test will continue to be regarded as a highly practical and valid examination of the intelligence of children.

The foregoing tests are individual in nature; to administer them special training and understanding are required on the part of the examiner, and considerable time is utilized in testing each subject. Group tests, therefore, have been devised for children with whom time, money, and lack of trained examiners preclude individual testing. These tests can be administered to varying numbers of persons, for example, a dozen five-year-old children or one hundred or more cooperating, mature young people. The examiner needs little training, since precise directions for giving and scoring accompany test materials. Characteristic items in these tests include: completion of sentences, completion of number series, general information inquiry, arithmetic problems, vocabulary, and memory.

Group tests of intelligence came into popular use after the Army Alpha group intelligence test had proved of value in classifying soldiers for various kinds of work during World War I. Group tests were later employed for diagnosing children's ability, for classifying them, and for predicting their development. Gradually the content of group tests was modified and extended. Some tests were constructed so as to include tasks that required little reading ability or proficiency in language. These nonverbal tests were particularly helpful in studying children having language limitations or reading deficiencies. Other group tests, which included both performance and verbal items, came to be looked upon as having greater validity than the purely verbal test. The Kuhlmann-Anderson Intelligence Scale is an example of a test that utilizes both types of test items.[17]

Most group tests have been constructed on the theory that intelligence is a general quality. Two more recently developed tests, however, the California Tests of Mental Maturity and the Chicago Primary Mental Abilities Test, have been built on the theory that intelligence consists of many relatively independent factors. The California Tests of Mental

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[17] *Kuhlmann-Anderson Intelligence Tests,* 6th ed. (1927-1952). Test booklets are provided on nine levels for the following grades: Kgn. 1, 2, 3, 4, 5, 6, 7-8, and 9-12 (Princeton, N. J.: Personnel Press, Inc., 1952).

Maturity are designed for use at three levels: Primary, Intermediate, and Advanced. The factors tested are visual acuity, auditory acuity, motor coordination, memory, spatial relationships, reasoning, and vocabulary. For each factor a mental age rank is found; a mental age rank is also obtained for Total Mental Factors, for Language Factors, and for Non-Language Factors. Some critics assert that the validity of these widely used tests has not been satisfactorily established.[18]

The Primary Mental Abilities Tests were developed by L. L. Thurstone and his associates after much experimentation aimed to reveal primary mental abilities. Seven primary factors are measured: the Number factor, the Verbal factor, the Space factor, the Word Fluency factor, the Reasoning factor, the Perception factor, and the Rote Memory factor. Since these "primary" factors were found to be significantly and positively intercorrelated, the makers of the test conclude that a "second-order factor" may account for the intercorrelations.[19] A "factor age" and "factor quotient" are obtained for each of the primary mental abilities tested. The tests have been devised for three levels: for ages five to seven, for ages seven to eleven, and for ages eleven to seventeen. At the present time, these tests are being carefully evaluated. Some critics vigorously assail the theory underlying their construction and assert that, until more evidence concerning their validity is assembled, the tests should be recommended with caution. Perhaps this is one reason for the continued popularity of the Kuhlmann-Anderson and other older group tests of intelligence.

Inheritance of mental ability

Is intelligence inherited? This perennial question is still unanswered, although the methods used in studies made in the 1930's provided pertinent data. The following means of securing data have been used: the correlation technique, family history studies, co-twin control procedures, and foster-children experiments.

The first technique involves ascertaining the correlation between intelligence test scores for groups of individuals of differing degrees of blood relationship. The following coefficients are representative of these investigations. One writer reports a coefficient of +.9 between the intelligence test scores of identical twins, whereas less resemblance is reflected in a coefficient of +.6 for fraternal twins. Between the test scores of typical brothers and sisters, +.5 is reported; for cousins, +.25; and for parents and offspring. +.4.[20] Thus, increase in amount of blood relationship is associated with increased similarity in intelligence test scores. This condition is alleged by some to show that by the side of heredity, all other factors are dwarfed in comparison.[21] However, such relationships do not reliably reveal the superior significance and influence of hereditary factors, since, as blood relationship increases, so do the frequency and probable strength of environmental factors. When two complex factors such as heredity and environment are studied, it is almost impossible to control a sufficiently large number of variables to enable one to state which factor is operative. Therefore, nearly all studies of nature-nurture, including correlation experiments, enable the proponents of each group to *find* a causal relationship.

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[18] F. S. Freeman, *Theory and Practice of Psychological Testing* (New York: Henry Holt & Company, Inc., 1950), p. 216. See also O. K. Buros, *The Fourth Mental Measurements Yearbook* (Highland Park, N. J.: The Gryphon Press, 1953).

[19] K. M. Byrne, "Testing of Primary Mental Abilities," as told to K. M. Byrne by T. G. Thurstone, *NEA Journal*, XXXIX (May, 1950), 346-347. See also Buros, *op cit.*

The results of another approach in the nature-nurture controversy may be similarly interpreted. Writers have presented imposing arrays of statistics showing the frequency with which mental superiority, anomaly, or defect persists in related stocks. For example:

> Two family lines established by a soldier in the Revolutionary War were compared. One line established by a feeble-minded woman contained 480 direct descendants, among which only 46 normal individuals were found. Among 496 direct descendants of the line established by a normal woman, all were normal with the exception of five.[22]

Interesting here is the work of Terman, who found that of 62 members in the Hall of Fame, 22½ per cent were related to 643 gifted children identified and studied in California.[23] This finding leads one to recall

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[20] F. N. Freeman, *et al.*, "Influence of Environment on the Intelligence, School Achievement, and Conduct of Foster Children," Twenty-seventh Yearbook of the National Society for the Study of Education (Bloomington, Ill.: Public School Publishing Company, 1928).

[21] G. M. Whipple (ed.), "Nature and Nurture, Their Influence upon Intelligence," Twenty-seventh Yearbook of the National Society for the Study of Education, Part I (Bloomington, Ill.: Public School Publishing Company, 1928). See also R. Stagner and T. F. Karwoski, *Psychology* (New York: McGraw-Hill Book Company, Inc., 1952).

[22] *Ibid.*, p. 266. Quoted by permission of the Society.

[23] L. M. Terman, *et al.*, *Genetic Studies of Genius: I. Mental and Physical Traits of a Thousand Gifted Children* (Palo Alto, Calif.: Stanford University Press, 1925). See also L. M. Terman, M. H. Oden, *et al.*, *The Gifted Child Grows Up: Twenty-Five Years Follow-up of a Superior Group* (Genetic Studies of Genius, IV [Stanford, Cal.: Stanford University Press, 1947]).

Galton's famous analysis of 977 men of genius who were found to have 535 eminent relatives, whereas, 977 average men had but four relatives who were eminent.[24] These data, and those more recently obtained by anthropological studies, demonstrate the potency of direct family relationships in effecting leadership and eminence; they do not, however, present an especially strong case for the superiority of heredity over environment, since both Terman's and Galton's groups consist of individuals coming typically from affluent, stimulating, and superior homes, in which ability is undoubtedly nourished.

A promising method of studying heredity was developed by Arnold Gesell.[25] It is of unusual significance because of technique—that of co-twin control. The development of identical twins was found to be so similar in emotional expression, in mental growth, and in certain motor acquisitions (such as stair-climbing) that Gesell concluded that environmental stimulation could not possibly explain the striking correspondence. Remarkable likeness persisted even when one twin member had undergone special training in stair-climbing, and another in vocabulary development. Regarding the vocabulary study, Strayer, working with Gesell, wrote: "The twins were sub-average (mentally) and not all the special training was able to bring them up to the average vocabulary of children three and one-half months younger than they."[26] It appeared, therefore, that "inner growth" or "maturation" sets levels that special training did not enable children to transcend.

Although Gesell's results are extremely interesting and pertinent, they must be viewed with reservation, since they are based upon observation of a small number of cases studied for a short time. A related question arises: What differences in intelligence appear in identical twins reared for many years in decidedly different environs?

One investigator reported the records of ten pairs of identical twins reared apart from birth or from infancy and brought together and studied at maturity. In six pairs no significant difference in test-intelligence was noted; in two pairs, twelve-point differences in intelligence quotients are cited; and the remainder differ by fifteen or seventeen points.[27]

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[24] F. Galton, *Hereditary Genius: An Inquiry into its Laws and Consequences* (2nd ed.; New York: The Macmillan Company, 1892).

[25] A. Gesell, "Maturation and the Patterning of Behavior," in C. Murchison (ed.), *Handbook of Child Psychology* (rev. ed.; Worcester, Mass.: Clark University Press, 1933), chap. 4.

[26] L. C. Strayer, "Language and Growth: The Relative Efficacy of Early and Deferred Vocabulary Training, Studied by Method of the Co-Twin Control," *Genetic Psychology Monographs*, VIII, No. 3 (Worcester, Mass.: Clark University Press, 1930), 209-317.

The data upon identical twins have been used to support the theory that heredity is *the* important factor in determining the intelligence of boys and girls. In fact, some books in psychology and education have overemphasized the force of heredity, leading the student to believe that an IQ is fixed, immutable—that an IQ can and should be used to predict future individual development and hence to classify children into homogeneous groups.

Influences of environmental factors and conditions on IQ

A number of studies have been conceived to ascertain the influence on IQ of enriched educational programs. The study of B. Wellman, made at the University of Iowa, yielded substantial gains for orphanage children who were provided with nursery school experience.[28] Yet in other studies, gains were not reported; in still others the gains were small and of little significance.[29] However, when one examines all the studies reported, he finds an unmistakable data trend that suggests that small positive changes in IQ accrue on intelligence tests following nursery school experience. More important than these slight gains are the improved attitudes and emotional poise that seem to result from attendance in some nursery schools.

Studies that have disclosed large changes in IQ for orphans and other underprivileged groups have been disquieting to many persons who have assumed the predominance of the heredity factor in the constancy of the IQ.

An investigation by N. Bayley dealt with tests and retests of children during the first three years of life. The same children were given several individual intelligence tests at regular intervals until they were nine years of age.

> The IQ changes evidenced by these children are of particular interest

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[27] G. C. Schwesinger, *Heredity and Environment* (New York: The Macmillan Company, 1933), p. 230.

[28] B. Wellman, "The Intelligence of Pre-School Children as Measured by the Merrill-Palmer Scale of Performance Tests" (University of Iowa Studies in Child Welfare, No. 3 [Iowa City: University of Iowa Press, 1938]).

[29] This material is reviewed in the *Psychological Bulletin* (Mar., 1940), and in the Thirty-ninth Yearbook of the National Society for the Study of Education, Part I (Bloomington, Ill.: Public School Publishing Company, 1940).

> because the children have all had a high degree of testing experience under relatively constant conditions. Because such experiences should reduce spurious variations to a minimum, smaller than usual IQ changes might be expected. Actually, the changes seem, in many respects, to be similar to those of other studies . . . a fourth of the group change 10 or more IQ points on retest made one year after the initial test; while an equal number change 17 or more IQ points over a three-year interval . . . When the amount of change in IQ from one test to a later one is plotted against IQ at the first test, the scatters show no significant relation between IQ and stability of scores.[30]

Another type of study that reveals a marked alteration in the IQ's of children is the study of children in foster homes.[31] One surprising result of these studies is the frequency with which high IQ's have been obtained. Leahy, for example, gives data for a group of children of ages five to fourteen, all of whom were adopted before they were six months of age.[32] The mean IQ is 110.5. Skeels cites an average IQ of 115.4 for 147 children adopted before they were six months of age.[33] Forty-one received IQ's of 120 or above.

Skodak's analysis supports these findings.[34] For eighty of the true mothers of certain foster children, mental test results were available. The average IQ of this group was 87.7. The majority of the mothers fell "below average"; 53.8 per cent had IQ's below 90, 16.3 per cent were borderline, and 13.8 were feeble-minded. Yet the average IQ of their children was 116.[35]

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[30] N. Bayley, "Mental Growth in Young Children," Thirty-ninth Yearbook of the National Society for the Study of Education, Part II (Bloomington, Ill.: Public School Publishing Company, 1940), pp. 18-20; quoted by permission of the Society. See H. E. Jones, "The Environment and Mental Development," in L. Carmichael (ed.), *Manual of Child Psychology* (2nd ed.; New York: John Wiley & Sons, Inc., 1954); H. C. Lehman, *Age and Achievement* (Princeton, N. J.: Princeton University Press, 1953). Students are advised to read the entire chapter of the Bayley study.

[31] M. Skodak, "Children in Foster Homes: A Study of Mental Development" (University of Iowa Studies in Child Welfare, XVI, No. 1 [Iowa City: University of Iowa Press, 1939]).

[32] A. M. Leahy, "A Study of Certain Selective Factors Influencing Prediction of Mental Status of Adopted Children," *Pedagogical Seminary and Journal of Genetic Psychology*, XLI (1932), 294-329; A. M. Leahy, "Nature-Nurture and Intelligence," *Genetic Psychology Monographs*, XVII (1935), 236-308.

[33] H. M. Skeels, "Mental Development of Children in Foster Homes," *Journal of Consulting Psychology*, II (1938), 33-43.

[34] M. Skodak, *op. cit.*

[35] Burks' criticism of McNemar should be examined: B. S. Burks review in *Journal of Abnormal and Social Psychology*, XXXV, No. 3, 458. See also J. Nisbet, "Family Environment and Intelligence," *Eugenics Review*, XLV (1953), 31-40; A. R. Gilliland, "Socio-economic Status and Race as Factors in Infant Intelligence Test Scores," *Child Development*, XXII (1951), 271-273.

The extent of the deviation in the IQ's of foster children and true parents is noteworthy; it suggests the operation of a number of related forces under circumstances that may be profitably analyzed. In attempting to account for these differences, one should recall that these children were adopted in infancy and that their early, most formative years were spent in an environment in which their foster parents may have been more zealous than typical parents to provide the best environment for the sturdy growth and development of the children whom they truly "wanted." It is certainly justifiable to assume that affection, love, and concern, generously but judiciously bestowed on growing children, have very desirable effects upon wholesome nurture.

It would be logical to assume that especially poor environments would retard development. And this seems precisely the result obtained in comparisons of younger and older children in several impoverished environments. Asher's study of Kentucky mountain children (1935), Sherman and Keys' study of isolated mountain children (1932), and Wheeler's account of East Tennessee children add corroborative evidence to the earlier studies of canal-boat, gypsy, and other sibling groups.[36]

These studies lead us to modify a rather prevalent concept about the constancy of the IQ. Since these studies suggest that alterations in IQ occur at every age level, it would seem best not to attempt to predict future development of children from the results of a single intelligence test. If this information is used with other findings about child development, it may enable a teacher to offer the child guidance and counsel that are valuable. But it cannot be too strongly emphasized that individual development is often variable.

Distribution of intelligence

The good teacher will attend to the uniqueness of boys and girls and will make an effort to discover each child's limitations and capacities. One type of data that reveals vividly the variations within a class may be obtained from an intelligence test. If an intelligence test is given to 100 typical school children, some extraordinarily high and some very low scores will be found. In fact, such great disparity will exist between the highest and the lowest scores that, if the difference is translated into mental age units, a range of several years will result. The slowest child of 100 ten-year-old pupils may be eight years old mentally, and the brightest, twelve or thirteen. However, the difference between the most retarded child and the one just above him will be relatively small, and similarly small will be the interval between the highest and the child just below him. Of course, many children will make similar scores, and if the scores are presented graphically, most of them will be found to cluster about a central point. Moreover, if these scores are changed into mental ages and the mental ages are divided by the chronological ages, the distribution in IQ's will appear according to the same general characteristics of a normal distribution curve. The teacher, therefore, will find it valuable to know as accurately as possible the mental maturity of each child in order that he may provide materials suitable for mastery by each child.

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[36] For an excellent summary, see the *Psychological Bulletin* (Mar., 1940), and C. L. Nemzek, "The Constancy of the I. Q.," *Psychological Bulletin*, XXX (1933), 143-167. See also G. D. Stoddard, "Intellectual Development of the Child: An Answer to the Critics of the Iowa Studies," *School and Society*, LI (Apr., 1940), 531.

Test scores for many types of school children have been found to be distributed roughly according to the normal probability curve. The majority of the population will be found in the intelligence quotient interval 90–110. This large group is sometimes referred to as "normal" or "average," because it represents best the typical school child and includes some 60 per cent of the total school population. Consideration of a typical distribution of intelligence test scores indicates that fewer cases appear as the scores become higher. Thus, it was found that whereas approximately 3 per cent of our children achieved IQ 125 and above, only 1 per cent (the gifted) reached or exceeded IQ 130.

Somewhat similar distributions of test scores will be found in children of different age and grade levels. Of course, in an inferior social district, where homes are poor and the general cultural conditions are poor, a disproportionately large number of low scores will be obtained, but the wide range and the concentration of scores about the central point still will remain typical features of the distribution. In a superior social district one will obtain an unusually large number of high IQ's, but the range will be great and the scores will cluster about a central point. The teacher may expect, therefore, to deal with children varying widely in ability, regardless of the nature of the district or the type of community in which he is teaching. The distributions in Table 23-1 are illustrative of the variability in the intelligence of school children when intelligence tests are employed.

TABLE 23-1

Percentage distribution of intelligence quotients of unselected children

IQ	*Witty: 1,000 Elementary-School Children Grades 1-8*	*Madsen: 880 Elementary-School Children Grades 1-8*	*Sandiford: Hypothetical Normal Population*
Above 140	0.03	0.2	0.25
120-140	8.5	9.8	6.75
110-120	14.3	17.4	13.00
90-110	56.9	51.6	60.00
80- 90	10.8	12.4	13.00
70- 80	7.2	6.4	6.00
Below 70	2.2	2.3	1.00
	99.93	100.1	100.00

Sex differences

With the introduction and general use of the intelligence test, it was found that the average scores of the sexes were strikingly similar.[37] Although many investigations have revealed only very small differences in the average test scores of boys and girls and of men and women, some studies have been interpreted as demonstrating greater variability of the male—a larger number making extremely low and extremely high scores. Wellman examined critically some five hundred references reporting six differences and concluded: "In the material covered, there seems to be some slight support for the hypothesis of greater variability of boys. The case is by no means clear, however, the findings depending so much on the measuring instrument, the measure of variability used, the selection of the children, and the sex which obtains the higher mean or median score."[38]

In a provocative account of the gifted child, Terman and Burks assert: "The ratio of gifted boys to gifted girls increases with age, being about seven to six for pupils in the elementary grades and approximately two to one in the high school. . . . The excess of boys may be due to greater variability of the male sex and (in later ages) to earlier cessation of mental growth in the girls."[39]

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[37] H. H. Goddard, "Two Thousand Normal Children Measured by the Binet Measuring Scale of Intelligence," *Pedagogical Seminary*, XVIII, No. 2 (1911), 232-259; L. M. Terman, *op. cit.*; E. A. Lincoln, *Sex Differences in the Growth of American School Children* (Baltimore: Warwick & York, Inc., 1927); and G. C. Schwesinger, *op. cit.*

[38] B. L. Wellman, "Sex Differences," in C. Murchison (ed.), *Handbook of Child Psychology* (rev. ed.: Worcester, Mass.: Clark University Press, 1933), chap. 15, p. 630.

Although Terman and Burks cite the results of several studies, they do not, it appears, report data regarding an adequate number of bright children to make their conclusions entirely dependable. Therefore, in order to study the problem more adequately, data were assembled by one of the authors from group intelligence tests given to 14,149 boys and 13,493 girls distributed through grades nine to twelve in thirteen secondary schools.[40]

As can be seen in Table 23-2, almost identical numbers of boys and girls are classified in the IQ interval 140 and above, and approximately equal percentages are found in the interval 130 to 139. It appears significant, further, that about 2 per cent of these secondary-school pupils have IQ's 130 or above. Although larger numbers of boys than girls are present in the subaverage categories, the differences between the sexes do not appear to be highly important. The essential similarity of boys and girls in test-intelligence is clearly demonstrated by the fact that 48.2 per cent of the boys reach or exceed the median score of the girls.

TABLE 23-2

Distribution of scores of 27,642 high-school pupils

IQ Group	Number		Percentage		% Ratio of Boys to Girls
	Boys	*Girls*	*Boys*	*Girls*	
140 and above	47	48	.332	.356	.938
130 to 139	250	244	1.767	1.808	.976
120 to 129	1,237	1,103	8.743	8.175	1.069
110 to 119	3,013	2,972	21.295	22.026	.967
100 to 109	3,896	4,080	27.535	30.238	.911
90 to 99	3,573	3,356	25.252	24.872	1.015
80 to 89	1,713	1,394	12.107	10.331	1.172
70 to 79	369	260	2.608	1.927	1.353
Below 70	51	36	.360	.267	1.348
Total	14,149	13,493	99.999	100.000	

SOURCE: Witty, *op. cit.*

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[39] L. M. Terman and B. S. Burks, "The Gifted Child," in C. Murchison (ed.), *op. cit.*, chap. 19, p. 776.

[40] P. A. Witty, "Relative Frequency of Gifted Boys and Girls in the Secondary School," *Educational Administration and Supervision*, XX, No. 8 (1934), 606-612.

Although this study deals only with secondary-school pupils, it suggests the essential similarity of boys and girls in general intelligence. It is, of course, true that there are more male than female "drop-outs" in school. Thus, it may be that data are not truly representative. Whatever the final answer to this speculation may be, these data suggest that differences in the intelligence test scores of boys and girls are relatively small and unimportant.

Race differences in intelligence

Rates of mental development have been assigned to various "races" in America. The procedure typically followed was to test samples of each "racial" group, calculate average scores, and make comparisons after consulting age equivalents or norms. C. C. Brigham analyzed the scores made by foreign-born recruits in the United States Army during World War I; he found that the recent immigrants made relatively low average scores, whereas the earlier immigrant stock made higher averages.[41] The conclusion was drawn, for example, that the average intelligence of the Poles, the Italians, the Russians, and the Greeks was low, whereas that of the English, the Scotch, the Germans, and the native-born Americans was high. The limiting effects of unfamiliarity with language, short period of life in a new world, and lack of acquaintance and experience with custom and tradition were not taken into account; however, Nordic superiority became a generally accepted myth despite the findings of subsequent studies that cast doubt upon the dogma of racial hierarchy.

In 1930, Brigham repudiated his earlier hypothesis concerning race differences because of statistical inconsistencies in the combined scale used for testing in the Army.

Klineberg, too, was not satisfied with conclusions drawn from the Army testing.[42] Proceeding on the theory that immigrant groups tested in America may not have been representative samples of the nations from which they had migrated, he attempted to make a comparison between certain "races" by testing school children in their home countries. He tested subjects in both rural and urban Germany, France, and Italy. The results of his study revealed that differences between races or nations are not so great as are the differences between individuals within a single race or country.

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[41] C. C. Brigham, *A Study of American Intelligence* (Princeton, N. J.: Princeton University Press, 1923).

[42] O. Klineberg, "A Study of Psychological Differences between 'Racial' and 'National' Groups in Europe," *Archives of Psychology*, CXXXII (1931).

Negroes in America have been studied much more extensively than the other racial groups; Negroes invariably make lower average scores than whites; moreover, Negroes possessing allegedly larger amounts of white blood usually make higher average scores than those of (suspected) pure Negroid ancestry. Pintner concludes:

> In the case of the Negro and perhaps in the case of the Indian we have a race of inferior intelligence as measured by our present intelligence tests and as compared with American whites. The greater the amount of white blood entering the various mixtures of the two races, the greater is the intelligence of the resulting progeny and this takes place because of the inheritance of mental ability.[43]

The statement that "the greater the amount of white blood . . . the greater is the intelligence" should be examined carefully. Psychologists are frequently unaware of the extent of miscegenation in the American Negro population. Anthropologists estimate that only about one-fourth of American Negroes are of unmixed Negroid ancestry.

There are only a few published studies dealing with the relationship of Negro-white ancestry to intelligence.[44] Investigators have usually separated the Negro subjects into groups on the basis of skin color and compared their average intelligence test scores. This method is of doubtful validity, because it has been demonstrated that the racial composition of the individual Negro cannot be determined accurately by estimates of pigmentation.[45]

Several studies of American Indian children have yielded lower test scores for this racial group than for white children. Indian children score much higher on nonverbal than on verbal tests. Klineberg described an investigation of the comparative ability of Indian and white girls in reproducing a simple bead design on a loom. In this test the Indian girls were superior to the white group, although both groups had received preliminary instruction in the use of the loom. In other nonverbal tests, such as drawing a man, Indian children did better than white children. It appears that scores on some items included in intelligence tests are similarly influenced by the culture in which the subject has lived.[46]

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[43] Pintner, *op. cit.*, p. 520.

[44] P. A. Witty and M. D. Jenkins, "Intra-Race Testing and Negro Intelligence," *Journal of Psychology*, I (1936), 179-192; P. A. Witty and M. D. Jenkins, "Educational Attainment of Gifted Negro Children," *Journal of Educational Psychology*, XXV, No. 8 (1934), 585-597; and P. A. Witty and M. D. Jenkins, "Case of 'B' —A Gifted Negro Child," *Journal of Social Psychology*, VI, (1935), 117-124. See also P. A. Witty, "New Evidence on the Learning Ability of the Negro," *Journal of Abnormal Social Psychology*, XL (Oct., 1945), 401-404.

[45] M. J. Herskovits, *Anthropometry of the American Negro* (New York: Columbia University Press, 1930), p. 227; M. J. Herskovits, "On the Relation Between Negro-White Mixture and Standing in Intelligence Tests," *Pedagogical Seminary*, XXXIII, No. 1 (1926), 30-42.

It must be clear that if a test were flawlessly constructed, it would be useful in making race comparisons when, and only when, the groups tested had had common interests and experiences.

To eliminate cultural influence, a number of attempts have been made to construct "culture-free" or "culture-fair" tests. These tend to be related to nonverbal and performance tests of other intelligence tests, since a culture-free test is necessarily largely nonverbal. In addition to being nonverbal the test must be free of any particular cultural content.

The Cattell Culture-Free Intelligence Test is one attempt to develop a fairer test.[47] General intelligence is assumed to be basically a matter of seeing relationships. It is further assumed that the ability to see relationships can be tested with pictorial or diagrammatic material. And the material must not be peculiar to any particular cultural group. Evidence is lacking that the test is truly culture-free or that it is usable in widely different cultures.

The Davis-Eells Games[48] are used as the basis for testing problem-solving abilities of first- through sixth-grade children. The tests were designed to eliminate "social-class bias." The series includes no written language but requires rather long oral directions from the examiner. The child identifies *Best Ways* to solve problems, *Analogies*, *Probabilities* leading up to a picture, *Money* calculations, and others.

The authors conducted a number of studies to compare the variations in performance on intelligence tests that were attributable to cultural factors. The Davis-Eells Games were designed to eliminate cultural bias by including only items having a common cultural content.

The tests require a considerable amount of time to administer—from one and one-half to two hours—and correlations with academic achievement are somewhat lower than for other general intelligence tests. These tests are still in the experimental phase and their value remains to be established.

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[46] O. Klineberg, *Race Differences* (New York: Harper & Brothers, 1935). *Cf.* also, W. Dennis, "The Performance of Hopi Children on the Goodenough Draw-a-Man Test," *Journal of Comparative Psychology*, XXXIV (1942), 341-348.

[47] R. B. Cattell, *A Culture-Free Test: Manual of Directions* (New York: Psychology Corporation, 1944).

[48] A. Davis and K. Eells, *Davis-Eells Games: A Test of General Intelligence, Directions for Administering Primary A and Elementary A* (Yonkers, N. Y.: World Book Company, 1953).

The student should anticipate that every racial and cultural group will contain some gifted children. As an example of this, the work of Witty and Jenkins is convincing.[49] Among 8,000 Negro children, they identified 26 of IQ 140 and above, one of whom was a child of surpassing test-intelligence. Great promise inheres in these children as well as in the gifted children in every other racial group. Let us therefore abandon the superstition or prejudice that leads us to stigmatize various racial groups and to condemn them to meager educational experience and opportunity.

In conclusion, the words of Franz Boas are fitting: "If we were to select the most intelligent, imaginative, energetic and emotionally stable third of mankind, all races would be represented." [50] The same should be said for different cultural groups.

Intelligence and aptitudes

Interest in the measurement of aptitude developed shortly after tests of general intelligence appeared. Although the more specialized tests were an outgrowth of job analysis, the areas of measurement soon included talents such as music, art, and different aspects of intelligence, without specific concern for job analysis.

What are aptitudes? How does measurement of them differ from measurement of intelligence?

Aptitudes are special skills, knowledges, and interests. Aptitude tests attempt to measure the potential of these special abilities. The tests cannot be used to predict success accurately. They can only indicate the presence of abilities or talents. These must be stimulated and developed to be brought to fruition.

Early aptitude tests measured mechanical comprehension, spatial visualization, manual dexterity, and clerical speed and accuracy. The decades of the 1940's and 1950's brought a greater concern for individual differences. Tests developed during these decades were designed to measure not only over-all intelligence but also different aptitudes. From use of these tests, a profile of individual strengths and weaknesses emerges that will aid teachers and counselors in the guidance of students.

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[49] P. A. Witty and M. D. Jenkins, "Educational Attainment of Gifted Negro Children," *Journal of Educational Psychology*, XXV, No. 8 (1934), 585-597.

[50] F. Boas, *Anthropology and Modern Life* (rev. ed.; New York: W. W. Norton & Company, Inc., 1932), p. 79.

Educators use aptitude tests to determine, for example, which pupils are ready to begin a formal reading program, which are ready for algebra, and which are ready for musical training. The Metropolitan Readiness Tests aim to identify children who are ready to read.[51] The battery includes six tests as follows:

1. *Word Meaning*—The child selects one picture in each row of four that illustrates the word the examiner names.
2. *Sentences*—The child selects one picture in each row of four that illustrates the sentence the examiner states.
3. *Information*—The child selects one picture in each row of four that illustrates the function the examiner describes.
4. *Matching*—The child matches similar pictures of objects, geometric forms, numbers, letters, and words.
5. *Numbers*—This test includes quantitative concepts and simple numerical operations similar to quantitative tests included in general intelligence tests for primary grades.
6. *Copying*—The child copies simple geometric forms as well as numbers or letters.

From use of this battery, the teacher gains help in finding out whether a child is ready for a formal reading program. Other factors must, of course, be considered.

When the major emphasis in testing was placed upon general intelligence, special aptitudes were regarded as supplementary to general intelligence. With the advent of new methods in test construction, notably factor analysis, it was recognized that intelligence itself included special factors. Thurstone utilized the factor analysis technique in the construction of the Tests of Primary Mental Abilities. He identified seven factors of intelligence.

Recent surveys have identified from eighteen[52] well-substantiated factors to fifty-nine factors.[53] Tests constructed on factor analysis techniques are still experimental in nature and are open to criticism of reliability and validity.[54] Attempts are being made, however, to deal with intelligence as the component of many traits and aptitudes.

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[51] G. H. Hildreth and N. L. Griffiths, *Metropolitan Readiness Tests: Directions for Administering and Scoring* (Yonkers, N. Y.: World Book Company, 1949). See also H. Hildreth, *Readiness for School Beginners* (Yonkers, N. Y.: World Book Company, 1950).

[52] J. W. French, "The Selection of Standard Tests for Factor Analysis," *American Psychologist*, VII (1952), 297-298 (abstract).

[53] J. W. French, "The Description of Aptitude and Achievement Tests in Terms of Rotated Factors," *Psychometric Monograms*, No. 5 (1951), 278.

The Differential Aptitude Tests (D.A.T.),[55] developed by the Test Division of the Psychological Corporation, are a battery of eight tests. The battery incorporates the major findings of factor analysis and is useful in both educational and vocational guidance of high-school students. Although the tests were designed primarily for grades eight through twelve, they may be used for adults too.

The D.A.T. was constructed to cover the range of abilities significant in an educational or guidance program. There was an attempt, too, to develop adequate norms for all the tests. The separate tests concern numerical ability, abstract reasoning, space relations, mechanical reasoning, clerical speed and accuracy, spelling, and sentences.

Measurements of musical aptitude and artistic aptitude yield scores that are not closely related to the results obtained from tests of mental capacity. There is, in fact, little or no relationship between aptitudes in these areas and general measures of scholastic aptitude. The problem of measuring musical or artistic aptitude is to determine the components of the talent and to devise an instrument for appraising them.

The Seashore Measure of Musical Talents[56] is the most thoroughly investigated test battery. It considers musical components as:

1. Discrimination of pitch,
2. Discrimination of loudness,
3. Discrimination of time interval,
4. Judgment of rhythm,
5. Judgment of timbre,
6. Tonal memory.

The examinee listens to the test items, which are presented on phonograph records, and marks his responses on an answer form.

Critics of the procedure claim that the components of music have been too minutely divided and that the activities of the musician do not require some of the abilities tested. Studies of the validity of the Seashore Tests are meager. In some studies an appreciable correlation with measures of musical success has been noted, but in others there has been very low correlation.[57]

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[54] For an introduction to factor analysis, see A. Anastasi and J. P. Foley, Jr., *Differential Psychology* (rev. ed.; New York: The Macmillan Company, 1949), chap. 15; and L. L. Thurstone, "Current Issues in Factor Analysis," *Psychological Bulletin*, XXXVII (1940), 189-236.

[55] G. K. Bennett, H. G. Seashore, and A. G. Wesman, *Differential Aptitude Tests: Manual* (2nd ed.; New York: Psychological Corporation, 1952).

[56] J. G. Saetveit, D. Lewis, and C. E. Seashore, "Revision of the Seashore Measures of Musical Talents," *University of Iowa Studies, Aims Progress Research*, No. 65 (1940).

The Meier Art Judgment Test[58] is an outstanding test for measuring esthetic judgment. It requires the examinee to choose the better picture of each pair, one an acknowledged masterpiece and the other a slight distortion of the masterpiece.

The Horn Art Aptitude Inventory[59] attempts to isolate the creative aspects of art. The examinee must produce a sketch from given patterns of lines and figures. The products are then evaluated according to standards given by the authors. Evaluation is partially subjective, depending somewhat on the perception of the scorer.

The artistic aptitude tests are more accurate in predicting artistic success of trained artists than in predicting artistic success of untrained individuals.[60] The criticism is made that the tests measure achievement rather than aptitude.

Special aptitude tests other than musical and artistic are numerous and aim to measure items such as mechanical and clerical aptitude. These efforts constitute a noteworthy beginning.

Aptitude tests and the gifted

Traditionally, the gifted child was identified primarily by tests of abstract intelligence. There is an increased tendency to think of a gifted child as one whose performance, in a potentially valuable line of human activity, is consistently remarkable.[61]

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[57] R. C. Larson, "Studies on Seashore's Measures of Musical Talent." *University of Iowa Studies, Aims Progress Research*, No. 6 (1930); R. M. Drake, "The Validity and Reliability of Tests of Musical Talent," *Journal of Applied Psychology*, XVII (1933), 447-458; and H. M. Stanton, "Measurement of Musical Talent," *University of Iowa Studies of the Psychology of Music*, II (1935).

[58] N. C. Meier, *The Meier Art Tests. I. Art Judgment: Examiner's Manual* (Iowa City: Bureau of Educational Research Service, University of Iowa, 1942).

[59] C. C. Horn, *Horn Art Aptitude Inventory: Preliminary Form 1944 Revision, Manual* (Rochester, N. Y.: Office of Educational Research, Rochester Institute of Technology, 1944).

[60] O. K. Buros, *The Fourth Mental Measurements Yearbook* (New Brunswick, N. J.: Rutgers University Press, 1953).

[61] P. A. Witty, "Education for the Gifted," in *The Gifted Child*, Fifty-seventh Yearbook of the National Society for the Study of Education, Part III, 1958.

The authors of *A Survey of the Education of Gifted Children* adopt a similar position:

> There is a threefold importance in looking for a variety of talent in children. First, such discovery points out to teachers that there are other bases besides intelligence for talent in children. Second, it calls attention to more children than a single talent-criterion does. Third, it encourages the teacher to use a variety of avenues of approach to children, whereas a single measure of giftedness narrows her approach.[62]

In an experiment now under way in Portland, Oregon, teachers' judgments and the result of standardized mental and educational tests are used for screening and examining children of high ability, with a view toward enrichment of their school programs. "Children are also screened for exceptional talent in the areas of art, music, mechanical comprehension, creative writing, creative dance, creative drama, and social leadership." [63]

Several promising techniques have been developed to identify such children. Paul Witty has discussed some potentialities in the use of films to promote creative expression, as well as the value of this approach as a method of identifying gifted pupils.[64] It is hoped that the future will bring more general identification and encouragement of children whose promise of creativity is great in many worth-while fields.

Aptitude tests can aid in identifying giftedness in areas other than abstract intelligence. Their limitations, however, make it desirable to study giftedness by observation of performance.

Summary

The intelligence testing movement appeared as a conspicuous luminary in 1916. By 1920, it had penetrated far and deeply into American educational practices; from 1920 to 1930, its influence was apparent in almost every school system. In many ways, its influence was clearly shown; for example, in almost all professional publications that made their appearance during this period it occupied first rank among topics considered to be of significance in effective teaching. In these volumes, students of education were advised of three main uses for mental tests: for diagnosis, prognosis, and classification of school children. The intelligence test was treated as an accurate means of ascertaining a pupil's growth. Accordingly, expectancies in educational accomplishment were set forth both for general academic proficiency and for specific subject mastery as well. Moreover, since it was believed that the intelligence test yielded a fairly reliable measure of inborn ability, test results were employed for classifying pupils into "homogeneous" groups. These and many other practices illustrate the far-reaching results of the intelligence testing movement in education.

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[62] R. J. Havighurst, E. Stivers, and R. F. DeHaan, *A Survey of the Education of Gifted Children* (Supplementary Educational Monograph No. 83 [Chicago: University of Chicago Press, Nov., 1955]), p. 6.

[63] C. W. Williams, in Havighurst, *et al.*, *op cit.*

[64] P. A. Witty, "The Use of Films in Stimulating Creative Expression and in Identifying Talented Pupils," *Elementary English* (Oct., 1956). See also J. Kough and R. F. DeHaan, *Teachers Guidance Handbook, Part I, Identifying Children Who Need Help* (elementary ed. and secondary ed.; Chicago: Science Research Associates, 1955).

During the past twenty-five years, intelligence tests have been subjected to careful study, and an immense amount of experimental data has been accumulated that enables one to appraise them with considerable fairness and impartiality. We are aware of the limitations as well as the values of intelligence tests. It is now clear that many of the high hopes and optimistic claims of mental test enthusiasts have not been fulfilled. For example, we are fully aware that a single test is not a reliable measure of the individual's mental ability. In this chapter, we have noted again and again the hazards of predicting mental growth from test results. And the fallacies and dangers involved in practices such as homogeneous grouping are now well established. In addition, we are now able to see how unwarranted and false were some of our assumptions associated with race or sex differences in intelligence. The development during the 1940's and 1950's of tests that attempted to measure both aptitudes and over-all intelligence, as well as aptitudes alone, broadened the basis for identification of talents and abilities. Although these more recent tests have contributed to an understanding of the varied nature of abilities, they have limitations. It is still defensible, as in the case of the gifted, to identify talent by performance.

When test results are considered in connection with other data in arriving at an estimate of a child's nature and needs, they are of undisputed value. Considered singly, they may prove quite misleading. But treated in conjunction with developmental data covering physical, emotional, and educational growth and home background, they help us in understanding children. Hazards in their use are numerous, but despite this fact, intelligence and aptitude tests may assist the teacher in arriving at a sound basis for intelligent diagnosis, understanding counsel, and effective guidance of school children.

QUESTIONS AND EXERCISES

for discussion and study

1 Formulate your own definition of intelligence, emphasizing what you consider to be the most important factors.

2 Define the following concepts: norm, M. A., IQ, reliability, validity.

3 Judging from your examination of tests and your reading, what do you think intelligence tests really measure? What factors essential to success do they fail to measure?

4 What are the values and dangers in the use of intelligence tests? Should the IQ of children be known by the children themselves? By their teachers? By their parents? Give reasons.

5 Why do the following findings of studies fail to prove that heredity has a more important influence upon intelligence than does environment?

a. High correlation between increase in blood relationship and similarity in intelligence test scores.
b. Frequency of mental superiority, anomaly, or defect in related stocks, for example in the Kallikak-Jukes-Edwards families.
c. Similarity of test-intelligence of twins in co-twin control studies.

6 Formulate what you consider to be a sound tentative conclusion concerning the relative influence of heredity and environment upon intelligence.

7 How is intelligence distributed in the typical school population? Observe, if possible, the pupils of some classroom and note the wide range of intelligence. Check your judgment of the intelligence of a few individuals at the upper and lower limits with intelligence test scores, and with teachers' judgments.

8 What criteria can be used in identifying the gifted? What are the limitations of intelligence tests in their identifications?

9 Why does the prevalence of low intelligence test scores among Negroes, Indians, and immigrant racial groups fail to prove that these groups are inferior to the white race in intelligence?

10 Formulate your conclusion concerning race superiority.

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Evaluation of learning

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IT IS IMPORTANT TO DETERMINE the effectiveness of the processes of learning and development in order to plan wisely for the next steps of instruction. These appraisals should be made periodically during the learning period as well as at its completion. The reports from these evaluations find wide application in current guidance, future guidance, transfer of students, and many other functions of the school. Examination of common practices suggests that procedures for evaluation and reporting student progress are simple processes. For many teachers they consist of giving and marking a series of tests and exercises, adding or averaging the marks, and entering them on a simple record card. The processes are used as if they could be quick, simple, and terminal. Actually they are continuous, cumulative, and complex procedures that demand considerable skill, ingenuity, and understanding.

The teacher's task in the guiding of learning is one of helping students to make progress toward some objectives that should be clear to both teachers and learners. It has become common practice to say that evaluation of pupil progress should be in terms of carefully defined objectives that are to be achieved. In order to make this possible, the objectives should be stated so that progress toward them can be evaluated and the evaluations should be of such character as to reflect the objectives as stated. Thus, if the teacher wants to determine whether his pupils have improved in "citizenship," it will be necessary to indicate some selected objectives in that area by breaking the term down into particular items about which specific evidence of pupil progress can be obtained. Both the evaluation of, and report on, progress in citizenship will not be in terms of a single score that was obtained nor of a mark given, but in terms of the language that was used in setting up the objectives. The evaluation of progress might then indicate the number of times and the effectiveness with which a pupil has carried out specific activities that come under the heading of citizenship, such as doing his share of keeping the room clean, serving on the traffic patrol, or participating in groups concerned with social action. When each of the specifics has been separately evaluated it may be possible to lump them into a general category, but the direct observation and evaluation of the specific aims of instruction are essential if evaluation is to be a useful process.

Evaluation of progress toward objectives

Apparently when most persons think of evaluation they think of tests. Some one hundred million standardized tests of the true-false, completion, matching, or multiple-choice type are used each year, and many millions of pupils are tested each year by locally constructed objective and essay examination. If the numerous objectives[1] set by the schools are to be evaluated, however, teachers must use many procedures for evaluation other than tests.

Among the lists of most common objectives set by schools one commonly finds such general headings as these:

1. The development of effective ways of thinking,
2. The cultivation of useful work habits and study skills,
3. The inculcation of constructive social attitudes,
4. The acquisition of a wide range of interests,
5. The development of increased appreciation of music, art, literature, and other esthetic experiences,
6. The development of social sensitivity,
7. The development of better personal-social adjustment,

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[1] See the many kinds of objectives listed in B. S. Bloom and D. R. Krathwohl, *Taxonomy of Educational Objectives* (New York: Longmans, Green & Co., Inc., 1956); and W. French, *Behavioral Goals of General Education in High School* (New York: Russell Sage Foundation, 1957).

8. The development of skill in reading, writing, oral, and aural phases of language,
9. The acquisition of important information,
10. The development of physical health,
11. The development of a consistent philosophy of life.

Evaluation of pupil progress toward such objectives, with all their subdivisions, is not possible by means of tests. It may be said that dependable objectively scored tests can be useful in the evaluation of progress toward objectives 1, 9, and parts of objective 8 of the list given above. Obviously, then, evaluation is a much broader and more complex process than the giving of tests.

Difficult as it may be, however, systematic evaluation of pupil progress must be attempted. Failure to do so often results not only in the listing of too many undefined and unrealistic objectives, but also in attempts of school personnel to try to justify their instructional procedures on faith rather than upon evidence of accomplishment. Neither of these situations is good for pupils, parents, or the public. If evaluation is well done, however, it may confirm estimates of the effectiveness of the teaching that is attempted or raise enough doubts so that teaching procedures or curricular offerings may be revised or rejected. Evaluation may produce evidence of effectiveness of instruction that will result in greater satisfaction with the work of educational institutions by pupils, teachers, and the public. It may also provide information that will be useful in responding to critics and in enlisting support for schools. In short, if teachers have a sound system of evaluating and reporting on pupil progress, pupils, parents, and teachers will know more about objectives and the progress that is being made toward reaching them.

Ability and achievement

Before one proceeds to an examination of particular methods of evaluation, it is necessary to consider the relationship of achievement to such matters as ability, aptitude, and potential, since, as the common argument goes, the amount of achievement must be limited by the potentials of the pupils for learning. It seems that one of the most common complaints about pupils is that they do not work up to their abilities. When those who complain are asked how these abilities or capacities have been assessed, they usually refer to scores on so-called intelligence, mental ability, or aptitude tests or describe pupils' performances in class at some previous time. Thus, they seem to suggest that one relatively brief sample of performance on a test or in regular class work dictates the standard that can be expected of the pupil at all times in the future. Those who say that pupils are not working up to their abilities should note that no test *measures* ability or aptitude. All that one can do with a test is to measure *performance* on a selected set of items. If the terms ability, capacity, aptitude, or potential are used when speaking of test scores, they should be recognized as *inferences* that may or may not be dependable for a particular pupil.

The practice of comparing a pupil's performance with some vague potential ability or aptitude based on scores of general mental ability tests is virtually outmoded. To say that a child is or is not achieving up to his ability or potential when that ability is only a score on a test suggests erroneously that the test score is a stable measure of some overall potential that can be mustered to accomplish objectives in any subject at any time, and that the potential is highly correlated with achievement. There is much evidence that neither suggestion is acceptable.[2] In any case, it may be argued that working up to one's ability at all times is not a desirable objective. Studies of evaluation procedures, in which a child's achievement is always expected to be up to some vague potential, suggests that an objective of some schools is to keep pupils working just short of the point of collapse.

Regardless of the stand one takes on the issues noted above, the practice of basing instruction on some vaguely determined potential for each student is not particularly useful to educators. If a pupil is not making progress toward an objective, it is expected that a teacher will do his utmost to help the pupil to make as much progress *as he can* in the time allotted. No mental test can define, except in very broad terms, the words "as he can" as they are used in the previous sentence. No mental test can determine the spot at which the teacher should stop trying to help a pupil toward goals that have been broadly conceived but are flexible enough to consider individual differences. It may be necessary to lower or otherwise change objectives for certain pupils or groups of students, but such changes should be based upon observed performance of pupils under maximum conditions of motivation and effort rather than upon some vaguely defined ability, capacity, or aptitude inferred from the brief samples of performance obtained by administration of a so-called mental ability or maturity test.

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[2] J. W. M. Rothney, *Counseling the Individual Student* (New York: The Dryden Press, 1949), 179-182.

Standardized tests of achievement

It seems highly unlikely that the reader of this book has not taken a standardized test at some time during his school and college career. If the reader will try to recall attempts made to evaluate his progress in school or college, he may remember that he was given a printed booklet in which there were questions to which he responded by making a mark or writing a word. He may even remember that this was scored by counting the marks or words that he put in the right places and that his score was then compared with those of large numbers of others of his age or educational level.

The large numbers of other students with whom a student may be compared are said to be norm groups, and distributions of the scores from such groups are called *norms*. When one uses the term *standardized test*, he refers to the fact that the test has norms. It usually means, also, that the test is scored by using a key, which designates the right answers. Tests made up and scored by teachers with a key, but which do not have norms, are not standardized tests.

The reader must be cautioned against reading too much into the term "objective." He must not think that because a test is *objectively scored* that all subjectivity has been eliminated from the testing process. In selecting the kinds and numbers of items for the test, subjective judgments were made by its author. In choosing methods of scoring, statistical procedures, and in selecting methods for validation procedures, the author used judgments that cannot be described as objective.[3] Completely objective procedures in the construction of tests have not yet been developed. It would be well to speak of *objectively scored* rather than objective tests, and to avoid thereby the frequent misrepresentation, oversimplification, and confusion that follows when the term "objective" seems to imply an exactness that current tests do not offer.

Validity of standardized tests

If a test does what it is employed to do, it may be described as *valid*. There are, currently, no completely valid standardized tests, and it seems unlikely, because of the complexity of human beings, that there will be any in the near future. At this time the best that can be done is to define very precisely what one wants the test to do and select the one that seems most likely to accomplish that purpose. The test that is chosen will be the one whose author presents the most adequate evidence that its use in similar situations has produced the results for which it was employed.

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[3] P. A. Sorokin, "Testomania," *Harvard Educational Review*, XXV (Autumn, 1955), 199-213.

Recently[4] it has become common practice to speak of four kinds of validity. When a test demonstrably covers completely, or provides adequate samples of, the subject matter taught by the teacher, it is said to have *content* validity. If scores on a test predict well what pupils will do at some subsequent time, it is said to have *predictive* validity. If scores on a test are highly correlated with students' current performances, it is said to have *concurrent* validity. *Construct* validity is evidenced when individuals' scores are of the kind that one would expect from the theory underlying the test.

In the evaluation of learning, the greatest concern is for *content validity*. The evaluator will ask whether the test contains the kind of material that the instructor has been trying to teach the children. He will also want to know if it requires them to employ the materials in the way he has been trying to get them to use it.[5] Assume, for example, that an instructor is trying to teach a child to spell all of the 100 words on a list. In order to test him, he can make up a test that requires him to spell all those 100 words separately. In this case, there can be no question about the validity of the test for determining whether the pupil can memorize a list of spelling words. When standardized tests are used, however, they are not always certain to cover *exactly* what was taught in a particular situation. When test items cover only samples of the instructor's materials and when those items are drawn so that they sample information taught in other than a particular situation, and perhaps in a different manner, the question of validity for local use must always be raised.

To answer questions that may be raised by potential users of tests, publishers of standardized tests usually attempt to indicate content validity by: (1) showing that the test is made up of items that have been drawn from widely used textbooks or representative courses of study, (2) showing that the test yields scores similar to those obtained by use of similar tests, and (3) presenting evidence that the scores are closely related to other evidence of achievement, such as teachers' marks. The first of these methods does not guarantee validity in a situation that departs from the usual; the second raises the question of the need for the new test if a valid one is available; and the third approach is unsatisfactory, since, if a test is highly correlated[6] with teachers' marks it would seem more economical to use the marks instead of the test. If the test scores are not highly correlated with marks, one still has the question of which of the two is more valid.

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[4] American Psychological Association, *Technical Recommendations for Psychological Tests and Diagnostic Techniques*, Supplement to the *Psychological Bulletin* (Washington, D.C.), Mar., 1954.

[5] P. J. Rulon, "Validity of Educational Tests," *Test Service Methods*, No. 3 (Yonkers, N.Y.: World Book Company, 1947).

Close inspection of the reports about validity of standardized tests contained in test manuals should make the user of such instruments consider seriously whether many of them can do the work they are employed to do.[7] If the purpose is simply to make a survey of the learning of students so that rough comparisons of scores of a particular group of pupils can be made to some similar group for which norms are available, the use of standardized tests may be defended as one step in the evaluation process. If they are used primarily to determine whether a particular child has learned what the teacher has attempted to teach over a relatively short period of time, standardized tests will probably not be as valid as well-constructed locally devised instruments. If they are to be used for grade placement of a child in a particular community, local norms should be available.

Reliability of standardized tests

It seems unfortunate that the word "reliability" was borrowed from common usage and employed as a technical term in the measurement movement. In common usage the term implies trustworthiness, general excellence, and dependability. In measurement it refers only to the *consistency* with which a subject responds to the items of a test over a brief period of time. It is theoretically possible for a test to be highly reliable but utterly worthless. Despite this fact, much of the discussion about educational measurements has revolved about the question of reliability. Some authors suggest that too much attention has been paid to the subject.[8]

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[6] By use of expectancy tables made from local test scores and teachers' marks, it is possible to use test scores to make general predictions of future achievements. See "The Use of Expectancy Tables," *Test Service Bulletin,* No. 38 (New York: The Psychological Corporation, 1948).

[7] G. E. McCabe, "How Substantial is a Substantial Validity Coefficient?" *Personnel and Guidance Journal,* XXXIX (1956), 340-344.

Evidence of reliability of tests is usually presented in terms of the kinds of coefficients discussed in a previous chapter. These coefficients have little meaning, however, until they are translated into figures that indicate possible variation of scores from one testing situation to another. These figures indicate the extent to which subjects' scores may vary up or down on repeated testings with the same or a very similar test. Thus, on one of the better new tests of school learning, scores are not given as a single figure but as a range or band within which the student's score may be expected to be found on repeated testings. Instead of reporting a score as at the 85th percentile, for example, the test result is presented as a range of from, say, the 80th to the 90th percentile.[9] Use of this concept more generally would probably result in avoidance of many of the current errors in the interpretation of test scores that follow from the consideration of a test score as an exact figure.[10] Very few tests are reliable enough to justify the exact and rigorous interpretation of test scores that are frequently made.

When one begins to evaluate school learning, he should not expect to get the kind of exactness one gets when he uses a ruler or a stop watch, since he can usually take only a sample of a student's performance.[11] Variability of performance is characteristic of a healthy human organism at best, and it is more variable when such factors as motivational differences, physical health, unsatisfactory test items, unclear directions for tests, and scores of other factors exert their influence. No very important decision is likely to depend on the difference between a reading test score of a fifth-grade pupil who scores at the second month in the fifth grade and, a week later, scores at the fourth month of that grade. If the difference were six months to a year, however, an important decision about placement of the pupil might be influenced.

The statistical treatment of reliability (stability) is too complex to present here, but the concept is important in all types of evaluation. It is essential that one get some evidence about the stability of results of any evaluation procedure, lest he place too much emphasis upon a particular bit of information obtained at a particular time and under particular conditions that may not be representative of a pupil's usual performance. In daily life, if one is asked to evaluate a person he has seen only once, he is likely to indicate that he does not know him well enough to do so and that he would like to see him again (get another sample of his behavior) before he makes a judgment. In effect he is saying that on one observation he could place the person with respect to any characteristic only within a wide band, but that if he had other chances to observe him he could evaluate the person more precisely. In doing so, one is applying the concept of reliability in his daily life. It is essential that teachers do not forget to apply it in the evaluation of learning.

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[8] C. C. Ross and J. C. Stanley, *Measurement in Today's Schools* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1954).

[9] *Manual for the School and College Ability Tests* (Princeton, N. J.: Educational Testing Service, 1956).

[10] J. E. Doppelt, "How Accurate Is a Test Score?" *Test Service Bulletin*, No. 50 (New York: The Psychological Corporation, 1956).

[11] D. Tiedemann, "Has He Grown?" *Test Service Notebook*, No. 12 (Yonkers, N.Y.: World Book Company, 1953).

Norms of standardized tests

When one chooses to use a standardized test, he does so primarily because it has *norms* that permit him to compare the performances of his subjects with others in terms of such characteristics as age and grade placement. If such comparisons are to be meaningful, the user of the test must be assured that the norms of the test are adequate.[12]

Most norms for achievement tests are obtained by computing the average of scores of several thousand pupils at a particular grade or age level in various types of schools and communities. The norm for a fourth grade in arithmetic, for example, is then the average score made by a hypothetical pupil who is assumed to have average scholastic aptitude, average arithmetic experience, and average quality and amount of instruction in that subject in the average school and average community. A *norm* then is a statistical picture of something that probably doesn't exist.

Norms of this kind may be useful to the superintendent of schools who wants to compare the average scores of the pupils in his schools with some hypothetical "national" norm, but they are not particularly useful to the classroom teacher. If his pupils are above or below the norm, it may be that they have reached that level simply because they varied from the subjects of the norm group in the learning opportunities they have had in the past. In any case, the teacher will want to adapt what he is teaching to the level that his pupils have reached as determined by his own day-to-day evaluative procedures, and he will want to move them ahead as far and as fast as they can go. It will not usually be particularly helpful to know that his particular pupils are above or below a fictional concept known as a national norm. He will not confuse norms that show performance in general nation-wide, state-wide, county-wide, or city-wide situations with *standards* that might be applied to particular groups. Bringing his pupils up to such norm groups can seldom be a real objective for a particular teacher and it cannot constitute a real evaluation of the learning that has taken place in his classroom.[13]

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[12] L. E. Tyler, *The Work of the Counselor* (New York: Appleton-Century-Crofts, Inc., 1953), pp. 134-135.

Diagnostic (analytic) tests

Since achievement tests survey performances over wide areas and since sampling of each area is limited, intensive evaluation of performance in particular subject fields is impossible. When the teacher wishes to get detailed evidence about a pupil's progress in a particular subject, he may decide to use a commercial or self-constructed *diagnostic* test. Such tests are usually devised by breaking down the functions to be performed in a particular subject such as arithmetic into small units and requiring the pupil to respond to items that cover specific types of performance. They may, for example, cover such limited areas as carrying in arithmetic, the use of capital letters in writing, or reversals in reading. Some may be lengthened to cover, say, the fundamental processes of addition, subtraction, multiplication, and division in arithmetic or algebra.

Basically, diagnosis and remediation go together. One uses a diagnostic test to determine whether remedial steps are to be taken with a particular pupil and to define their coverage if they are to be used. Essentially, then, the evaluation of learning by diagnostic tests is for use in one rather narrow phase of an ongoing program of instruction in a particular subject area.

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[13] A good statement about the current status of the standardized test movement and suggestions for its improvement will be found in H. G. Seashore, "Understanding the Individual Through Measurements," in A. E. Traxler (ed.), *Goals of Education* (Washington, D.C.: American Council on Education, 1950).

Teacher-made tests

Standardized tests would probably be most effective in schools in which the materials to be covered, and the teaching methods to be used, were prescribed to the extent that much similarity in practice would be found. As teachers are given increased opportunities to select their own methods and adapt to local circumstances, they are given greater responsibility in the development of tests to evaluate their own programs. Such custom-made tests have definite potential advantages due to the fact that they permit more specific, more detailed, and more individualized evaluation than standardized tests permit.

One of the disadvantages of local construction of tests, however, lies in the waste that may be involved when many teachers do repeatedly what many other teachers in the same school system or even in adjoining classrooms are doing. Another is the fact that skill required in test construction is not always developed by teachers who may be highly proficient in other phases of the teaching-learning process.

In order to offset the disadvantages of waste and amateurism, and to realize the advantages of customizing the evaluation process, it would be desirable to have a pool of items of known discriminative value made available through local, state, or national organizations. From such a pool the teacher might select items to prepare a test that would cover the objectives that he had set for his teaching. Currently this is not a common practice, but it is such a promising one that the time may soon come when lists of test items are made available to teachers. They will select items to construct their own tests, and substitute them for standardized tests in many evaluative procedures.

Until such pools of items are available and even at times after they are, teachers will still be required to make up their own tests for use in their classrooms. In doing so they may profit from study of some of the practices developed and used by the builders of standardized tests—although they need not be limited by the methods that have been utilized in attempts to get nationally representative items or objectively and rapidly scored tests.

The decision about the form of the locally made evaluation instrument will be determined by the objectives of the instruction. If the purpose is to determine whether pupils can write well, there is no substitute for the essay form of test. An objective test of rules, grammer, punctuation, and paragraphing will not be suitable for the stated purpose. If the purpose is simply to know whether pupils remember such facts as that there are twelve inches in a foot, *true-false* items containing statements to that effect may be used. If the goal of instruction is to teach pupils to make discriminative judgments among items that are not too obviously alike or different, the *multiple choice* form of item may be used effectively. Occasionally when the teacher wants to determine how well the pupil recognizes that certain relationships between selected bits of information exist, he may choose to employ a *matching* test. There is no one best form of item for all purposes, and there must be selection of the appropriate form for evaluation of particular objectives. If a test is to be used in evaluation of progress toward several objectives, it may contain all or any combination of the kinds of items noted above. Students should secure copies of tests that use such items, and indicate the advantages and disadvantages of each.

If the teacher decides to use an essay test, he has selected the form that is probably most difficult to devise and score. If he is to get the most out of this form of test, the items will have to be drafted so that they require more than evidence of memory. Such evidence could probably be better obtained by use of true-false items. If it is used to obtain evidence of exercise of judgment on the part of the student, the directions must make that explicit. And the essay questions cannot be so vague that the student may write much in the hope that something he writes will answer the question if he writes long enough. Further, the scoring procedure will be improved if the teacher prepares in advance a list of important points to be expected in the pupil's answers. It will help too if the teacher reads the answer to the first question on all the papers, then reads the second question, and so on, rather than reading all the answers of each pupil consecutively. When such precautions are taken there is reason to believe that the essay test may still be the most effective device for evaluating a pupil's progress in expressing ideas and the analysis or synthesis of information.[14] With the rise of the testing movement and the emphasis placed on objective scoring by measurement experts, essay tests fell into such disrepute that many teachers stopped using them or felt guilty if they did so. It appears now that these steps were undesirable and unnecessary.

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[14] *Manual for the Sequential Tests of Educational Progress* (Princeton, N. J.: Cooperative Test Division, Educational Test Service, 1957).

Limitations of tests in evaluation

The most complete battery of tests ever assembled and administered would not provide a complete evaluation of a student's learning. In addition to the fact that there are no adequate tests for many of the objectives listed on page 677, it must be noted that tests can provide only the raw materials for evaluation. These need much interpretation.

Measurement by tests may tell us how much the pupils have mastered or how much progress has been made during a course of instruction, but it does not tell how good the results are. Amounts are not necessarily indicators of value. It is possible to determine by use of tests whether pupils have made higher scores than they did previously in reading, but tests do not tell if there has been increased use of reading for personal satisfaction or study of materials that may help in developing concern about social problems.

The use of tests in attempts at evaluation of personality characteristics is particularly difficult. In measuring achievement by tests, the more questions the pupil can answer in the time allotted the better the result is considered to be. In attempts to measure personal characteristics, however, the amount of the characteristic displayed does not necessarily indicate greater excellence. Highly consistent behavior is probably undesirable if it develops into rigidity. Responsibility in the extreme may result in an unhealthy degree of anxiety. Extreme social adjustability may mean that the pupil has difficulty in getting his homework done and is unhappy at times at which he must be alone. Up to this time it has not been possible to devise a testing technique by which optimum degrees of such personal characteristics can be measured.

Although there has been some improvement in the construction of tests so that scores obtained by the same pupil at different times are somewhat comparable, there is still much that needs to be done before such performances can be compared. When one wants to know whether a child has grown in height he can apply a yardstick at several different ages. He can be reasonably sure that his measurements yield evidence of growth and that the application of the ruler to the pupil did not influence his growth. Inches are presumably the same whether one measures a first grader or a college student. Test scores in terms of reading grades or ages are not the same, because the meaning of a grade in school varies widely, and chronological age may reflect changes in quantity and quality that have resulted from the pupil's many experiences in and out of school. As a matter of fact, his experiences with tests themselves may be one of the forces that has changed the results.[15] One cannot say that a child has grown four grades in reading with the same assurance that one can say that he has grown four inches taller. Really comparable test units that permit dependable measurement of growth over a period of years have not yet been developed, although progress in this area is being made. Even, however, when they have been developed, the evaluator will still be left with the task of deciding whether he thinks the changes are in desirable directions.

Despite the various limitations of objectively scored tests noted above, they have served and will continue to serve as devices that emphasize the presence of individual differences among students. They have provided a method for wider sampling of students' powers and achievements and have served effectively in the checking of teachers' judgments about students that may have been based on too rapid, too narrow, and too personalized judgments. Without objectively scored tests it would have been impossible to do much of the research on the mental and academic development of children and youth that has influenced the educational process. As the testing movement comes of age it seems likely that tests will continue to serve effectively in making better evaluations of the growth and behavior of the students in our schools.

Evaluation of personal-social development

Among the common objectives listed by schools, one commonly finds some that might be considered as nonacademic in nature. They are frequently labeled with such terms as "personality growth" or "personal-social development" and they generally include items similar to those numbered 3, 4, 5, 6, 7, and 11 in the list given on page 677. To many persons these are more important objectives than the others in the list, but they are the areas in which least progress has been made in the development of evaluative procedures.[16]

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[15] W. F. Dearborn and J. W. M. Rothney, *Predicting the Child's Development* (Cambridge, Mass.: Sci-Art Publications, 1941), pp. 110-139.

Difficulties in making satisfactory evaluations of pupils' progress in the areas noted above are due to the fact that the individual is so complex. Rating of development is often invalid because of difference in philosophies of persons who rate, inadequate opportunities to observe the rate, semantic difficulties with definition of terms, problems in making scales with satisfactory units, halo effects, and various other problems. Questionnaires labeled as interest inventories and personality "tests," which require self-report and self-incrimination, have currently insuperable limitations.[17] The validity of projective devices is always suspect unless used by highly trained specialists, and personal documents are more useful in detecting clues than facts.[18] Sociograms seem to be useful devices in the training of teachers in pupil observation, but the shifting relationships within classes suggests that their frequent use is impractical. Anecdotal records suffer from difficulties in observation and semantic problems in reporting, and they often elaborate the obvious.[19]

The major difficulties in using the techniques mentioned above, and the many minor ones that their use entails, are major obstacles to evaluation of the personal development of pupils. Anlaysis of the results of the use of the techniques noted above suggests that educators have been attempting to bypass a phase that no field of science has yet avoided. It seems that for all sciences a long period of observation and description is essential before adequate systems of measurement are developed. Currently it appears that there are no completely adequate procedures for measuring development toward many of the objectives in personal-social development that educators set.

Collection of the new data for evaluation of personal-social development can probably best be done by recording of *descriptions* (not ratings) of pupils' behavior by those persons who have had sufficient opportunity to observe it, and who have developed some categories into which usual behavior of young people can be classified.[20] Changes in pupil behavior must not be considered significant unless it can be demonstrated that they are greater than the differences between different observers or the same observers at different times.

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[16] L. E. Raths, "Understanding the Individual Through Anecdotal Records, Sociometric Devices and the Like," in A. E. Traxler (ed.), *Goals of American Education*, American Council on Education Reports, No. 40 (1950), pp. 63-73.

[17] R. B. Cattell, *Description and Measurement of Personality* (Yonkers, N.Y.: World Book Company, 1946), pp. 341-342; E. J. Furst and B. G. Fricke, "Development and Application of Structured Tests of Personality," *Review of Educational Research*, XXVI (1955), 27.

[18] J. W. M. Rothney and R. A. Heimann, "Development and Application of Projective Technics," *Review of Educational Research*, XXVI (1955), 66; G. W. Allport, *The Use of Personal Documents in Psychological Science* (New York: Social Science Research Council, 1942).

[19] A. E. Traxler, *Techniques of Guidance* (New York: Harper & Brothers, 1957)

Teachers are usually required to report too frequently and in too much detail about pupils' personal characteristics. Lists of objectives for personal growth are so long that observers get lost in the detail and confounded by words that have different meanings to many persons. In reducing the details, there is danger of getting lost in excessive generalization about an individual from too few observations. Intsead of requiring perfunctory ratings of too many kinds of behavior, it would seem advisable to have groups of teachers select a relatively short list of characteristics for observation and description. In choosing them they would select on the criteria of *importance*, *observability*, *reasonable completeness*, and *relative independence*. At suitable times the teacher would describe his pupils in terms of carefully worked out definitions that usually fit most of his students. If the fit is not adequate the teacher may write comments.

The behavior-description method seems to be the most useful method for evaluation of growth in personal-social behavior at this time. Meanwhile research on new methods and refinement in older techniques may be expected to continue.[21] Currently there is no clearly satisfactory method of assessing progress toward what many persons consider to be the most important objectives of the educative process.

Reporting pupil progress

There are many opinions about methods of recording and reporting about pupils' development, but there is very little evidence from research about the best way in which it should be done.[22] For most teachers the process is one of giving some tests, averaging the scores, and placing them, or marks derived from them, on cumulative records kept in the school and on small cards that the pupil takes home for his parents' signatures. The cumulative records are said to be useful in helping others in the school to evaluate the pupil's progress and in helping him get a better concept of himself. The report to the home is intended to advise parents about their child's progress in learning. If this objective is to be accomplished, more attention than is currently given must be devoted to the many problems encountered in making satisfactory records and reports. The writer has recently seen some reports to the home that were used by schools about one hundred years ago. Many of them were very similar to those that are currently used.

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[20] For samples of such categories, see E. R. Smith and R. W. Tyler, *Appraising and Recording Student Progress* (New York: Harper & Brothers, 1955). For a simplified version of such categories, see J. W. M. Rothney, *The High School Student* (New York: The Dryden Press, 1956).

[21] P. Jacobs, *Changing Values in College* (New York: Harper & Brothers, 1958).

[22] See the discussion of the development of cumulative records in *Manual for Cumulative Records* (Washington, D.C.: American Council on Education, 1945).

Reports to parents, to other teachers, and to the child should indicate with definiteness where a pupil is showing strength or weakness as judged by normal expectations of children of like ages and opportunities and in terms of his own potentialities. They should describe a pupil's progress in a way analytical enough to give helpful guidance and to indicate the pupil's likelihood of success in continuing work in certain fields both in later years in school and in advanced institutions. In effect, they should form a basis for current guidance, preserve material so that it can be used with continuity over a term of years, help the staff to give guidance about a pupil's further education or entrance into an occupation, and provide information for use in cooperative planning of the next educational steps with the parents.

The chief merit of a good cumulative record is that it presents a rather complete longitudinal picture of a pupil's records brought together from many sources. It usually contains information about his academic achievements, test performances, interests and activities, health and physical development, and usual behavior and significant deviations from it that have been compiled over a period of years.[23] To these are added descriptions of his family and reports of teachers' conferences with parents and child. If it is well kept and frequently used, it may assist in putting together the many-sided puzzle of individual achievement, interests, personalities, attitudes, ambitions, health, and home circumstances, and point the way to happiness and success for the pupil rather than to disillusionment and failure.

If cumulative records are *used* by teachers in the study of the child and are made the basic source of data for informative oral or written reports to the parent, they can portray the child's progress better than any other device. They can, if properly developed and used, direct the minds of pupils, parents, and teachers away from marks as major goals of learning and toward the fundamental objectives of education. With those fundmental objectives in mind, it is then possible to determine from the cumulative record whether or not progress has been made toward them. That is essentially the function of evaluation of learning in educational institutions.

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[23] A. E. Traxler, *Techniques of Guidance* (New York: Harper & Brothers, 1957).

Evaluators in the past have tended to put too much reliance on single measures that covered too short periods of time. In the future it seems likely that combinations of measures obtained over longer time spans, and which may even include evidence of post-school performances, will be demanded.[24] Examples of such evaluative practices are now beginning to appear in the educational literature. In presenting moving pictures rather than snapshots of individuals and groups, they provide impressive evidence of the power of longitudinal data obtained from many sources in the portrayal of the influence of educational experiences upon the development of students.

Summary

Evaluation of learning has been shown to be a complex and cumulative process of determining whether objectives of learning are being or have been achieved. Objectives of various kinds have been indicated and methods of assessing pupils' progress toward them were described. It was suggested that scores from tests of academic achievement provide only the raw materials for evaluation and that the administration of tests is not an evaluative procedure in itself. The limitations of standardized tests, even those of high content validity and high reliability, in the evaluation of academic progress of particular individuals in particular classrooms have been noted. Reasons for use of particular kinds of tests of academic achievement have been indicated.

The particular difficulties that are met in assessing progress toward other than academic objectives have been outlined. It has been indicated that completely adequate techniques for getting the raw materials for evaluation in this area are not yet available. Suggestions for improvement of evaluation and the reporting of pupil progress to parents, to school personnel, and to pupils themselves have been briefly noted.

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[24] D. Chamberlin, *Did They Succeed in College?* (New York: Harper & Brothers, 1942); C. V. Millard and J. W. M. Rothney, *The Elementary School Child* (New York: The Dryden Press, 1957); J. W. M. Rothney, *Guidance Practices and Results* (New York: Harper & Brothers, 1958); A. Townsend, *College Freshmen Speak Out* (New York: Harper & Brothers, 1957).

QUESTIONS AND EXERCISES

for discussion and study

1 Write down one achievement objective and one personal development objective that you might be working toward in the teaching of your major field of concentration. Show how you would determine whether *progress* toward the attainment of the objectives had been made. Indicate how you would show that the objectives had been *adequately attained.*

2 Secure a copy of a report to the home that is used by a school. (Perhaps you can obtain one of your own reports made to your parents while you were in school.) What objectives of the school can be inferred from the report? Can you determine how the data for evaluation were or could be obtained? How meaningful would such a report be to the parent? How would you go about making improvements in the report?

3 In one study of elementary-school children, it was found that most pupils received lower marks in grades 5 and 6 than they had obtained in earlier grades of the same school. Two reasons for this finding were given. The first was that the pupils received less drill and practice exercises in the fundamentals in these grades and the second was that the pupils were changing because they were just beginning the pre-pubertal spurt. Comment on the reasons given and add any other reasons you can suggest for the changes. In what way are the explanations given here, and those added by you, related to general problems of evaluation?

4 The following statement appeared in a teacher's summary report about a boy in the fourth grade: "John has grown up considerably this year. He gets along much better with the group and is able to stay out of difficulty. He is a likeable boy, cheerful and cooperative. Still a slow worker, though his study habits are greatly improved. Believe that he will always require prodding, since he is the type that takes life easy. Takes far too long to accomplish anything he does, but is doing a better job of concentrating on his own work and affairs than he did earlier." What objectives of the school are implied in the evaluations given above? How could the evidence for the statement have been obtained? What would you need to know about John, his school, and his teacher before you would accept the statement?

5 In the use of national norms for tests, it is assumed that the pupils who take the tests have had substantially equal opportunities for education.

Schools in the United States have much freedom in choosing the educational experiences provided for pupils, and there are wide differences in community expenditures for education, requirements for teacher training, and in the cultural and socio-economic status of students. In view of the assumptions implied in the use of national norms and the realities of differences, indicate the use to which such norms may be useful in evaluation.

6 Select a case history from one of the books in the Selected References for Further Reading, which appears at the end of this chapter. In what ways does it serve to appraise the development of the child in the past and point the way to future growth? Which of the techniques used seemed to contribute most to those purposes? Give your reasons.

7 Examine the stated purposes with respect to student development of the college or university that you now attend. (It will usually be found on the first page of the catalog.) How should the college proceed to determine whether the purposes are achieved? What evidence do you have that you are achieving them? In what ways has *your own* progress toward them been evaluated?

8 Construct a device for teachers to use in evaluating their pupils' development in the characteristic of *meeting responsibility*. In doing so, avoid using a rating scale, define your terms clearly, and use sentences rather than single words that might have widely different meanings to different teachers. Use only the kinds of information that the teachers can get from observation of the pupils in their classes and do not require so much from the teachers that they will be overwhelmed with the work involved. Present your device for criticism to other members of your class. Describe the difficulties you met in your attempt to construct the device.

9 An eighth-grade student made the following grade level scores on a standardized test: Paragraph meaning, 7.0; word meaning, 8.4; spelling, 8.0; language, 9.4; arithmetic reasoning, 9.0; arithmetic computation, 10.0; social studies, 8.2; science, 8.5; study skills, 6.5. What next steps in work with this student are indicated by the test scores? In which areas would it be desirable to administer a diagnostic test? How would you interpret this set of scores to the student's parents?

10 A college sophomore's test scores were at the following percentile levels on national norms of a general college achievement test: Mathematics, 7; physics, 3; chemistry, 32; biology, 33; economics, government, and history combined, 5; literature, 25; fine arts, 6. He had taken the regular college preparatory work and courses in each of the subjects listed above while he was in college. Questions are raised about whether the student should continue in college, and about the field in which he should major if he decides to do so. What other information is it necessary to obtain before decisions on the two questions can be made?

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CHAPTER 25

Individual differences in mental abilities: their educational implications

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Introduction

THAT INDIVIDUALS DIFFER in mental abilities, as well as in physique and traits of personality, has been known for many centuries. But it is only within relatively recent years—approximately sixty—that the extent, causes, and educational significance of variations in mental abilities have been studied and made explicit.

Our knowledge of human variability in the higher, more complex processes has grown in range, detail, and validity, in spite of the fact that definitions of intelligence differ, and in spite of certain difficulties inherent in the tests being used.[1] The fact is that, all things being equal, the best of the available standardized tests provide the most reliable method of determining mental abilities, if we disregard for the moment the question of the factors involved. Elsewhere in this book, the several relevant problems are dealt with—namely, the nature of intelligence and the existing devices for its measurement. In this chapter, we shall be concerned primarily with the extent of individual differences in mental abilities, the factors responsible for these differences, and their educational implications.

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[1] F. S. Freeman. *Theory and Practice of Psychological Testing* (rev. ed.); (New York: Henry Holt & Company, Inc., 1955).

Extent of individual differences

The notion of types. It is impossible to represent a person in his entirety by means of a single index. No single psychological test or other device will reveal all the integrated aspects of an individual's personality, his ability in arithmetic, language, general intelligence, and so on. What any test or device does is measure or describe an *aspect* or *segment* of the individual. The aspect measured may be relatively simple, as in the case of reaction times, or relatively complex, as in the case of intelligence. Thus, curves of distribution that portray human variability represent selected traits rather than the distribution of total personalities.

Scientific doctrines of human abilities and differences, therefore, are not in agreement with the popular opinion that all persons fall "naturally" into distinct types, with definite gaps existing between the alleged types. According to this erroneous notion, a person is either "visual-minded" or "auditory-minded," "mechanically-minded" or "language-minded," musical or unmusical, artistic or unartistic, athletic or unathletic, intelligent or unintelligent, of good disposition or bad disposition, and so on.

It is also unfortunately true that popular opinion is not alone responsible for theories of distinct types; some psychologists and psychiatrists have contributed to the fallacy by their emphasis upon the extremes of personality discovered in clinical cases (where one expects to find extremes, of course). Thus, from time to time, they have postulated subjective and objective types, the theoretical and the practical, perseverators and non-perseverators, introverts and extroverts, the ascendant and the submissive, and others. When their dichotomies failed them—for it became apparent, as it must, that human beings do not lend themselves to a twofold division—these writers introduced "mixed-types," and thereby created a threefold division.

But, as a matter of fact, human beings in their range and complexity of variability can no more be classified properly as members of one or another of these types than they can as giants or dwarfs, geniuses or idiots. This does not mean that there are no individuals at either extreme in these and other traits. It means that when persons in general are studied, it is found that instead of two opposed types there is a continuous gradation from one extreme to the other, which shows a concentration of individuals about a central point with the frequency of occurrence decreasing as the deviation from the central tendency increases. Individual differences are matters of degree and are distributed along a continuum.

If it were true that an ordinary, unselected group of persons naturally falls into classes or types, statistical distributions and their graphs should be of a bimodal or multimodal type—that is, having more than one mode or point of concentration at or near which a large percentage of the group will fall in the distribution, with gaps existing between the modes. In other words, there should be a mode for each alleged type. Such a multimodal distribution would be portrayed by a curve like that shown in Fig. 25-1.

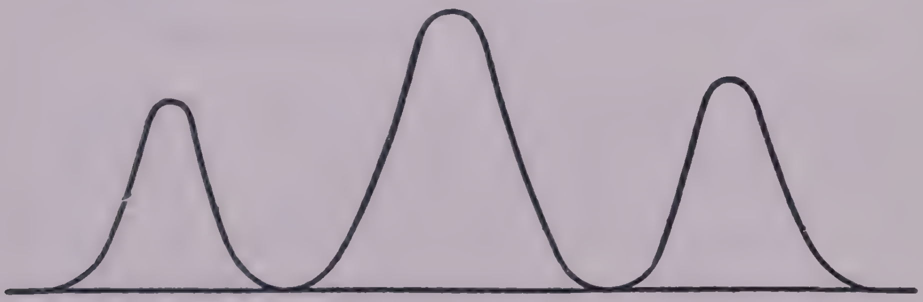

Fig. 25-1. A multimodal curve.

On the contrary, studies of human abilities yield a curve with a single mode (Fig. 25-2), which means there is one type—namely, the average, or mediocre—and that cases occur with decreasing frequency as the amount or quality of the trait deviates from the norm.

It is conceivable that under special conditions of growth and education rather sharply defined groups might be formed; although even so there might still be overlapping of groups. For example, in all probability there would be a bimodal curve of physical measurements if half of the children were undernourished and malnourished from early infancy, whereas the other half were nurtured under ideal conditions; in social attitudes, if half were educated in the traditions of a culture diametrically opposed to the cultural traditions of the other half; in linguistic or any other ability, if half were educated in an environment rich in opportunities to foster and conserve that ability, whereas the other half matured in an environment barren of the necessary educational influences. But under present conditions of development, the nature and extent of individual differences in a particular trait or complex of traits is represented by the unimodal curve that portrays the range of human ability in that trait (Fig. 25-2).

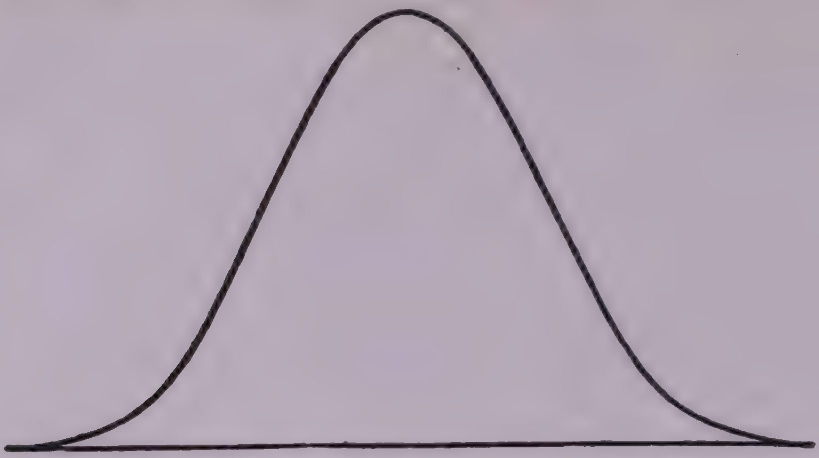

Fig. 25-2. The theoretical normal probability curve.

The educational implications of the distribution of human abilities, though easily discerned, are very significant. In the first place, since the general population is not divisible into two or three ready-made classes in any psychological traits that have been investigated, there are no readily available and fixed categories that the school can employ for the purpose of differentiated instruction. In the second place, the spread, or range of abilities as shown by the "normal" curve, is such as to make imperative differentiated educational procedures, whether in the form of acceleration, or enrichment, or both, and whether by homogeneous classes, or by groupings and individualized instruction within a single heterogeneous class. Third, since there are no ready-made and easily determined categories or types, the problem of classification for purposes of instruction is the harder, and presents administrative as well as instructional difficulties. And, finally, because individuals do not fall readily into one type or another, each having its own characteristics, the importance of the *individual*, not of an alleged type, is emphasized. The implications of individual differences for education will be discussed later in this chapter.

Although we are concerned primarily with differences in mental abilities, we must point out that an individual's performance in school or occupation, or as a social being, is not a matter solely of the level of his mental abilities but depends, also, upon nonintellectual factors, such as those of emotion, motivation, cultural status, health and physique, educational values, and facilities. A truly superior intellect may be vitiated by unfortunate traits of personality, whereas, in certain instances, desirable traits can supplement and in part compensate for an intellect of mediocre caliber or less. Superior potentialities may go undeveloped or superior abilities unused for lack of opportunities.

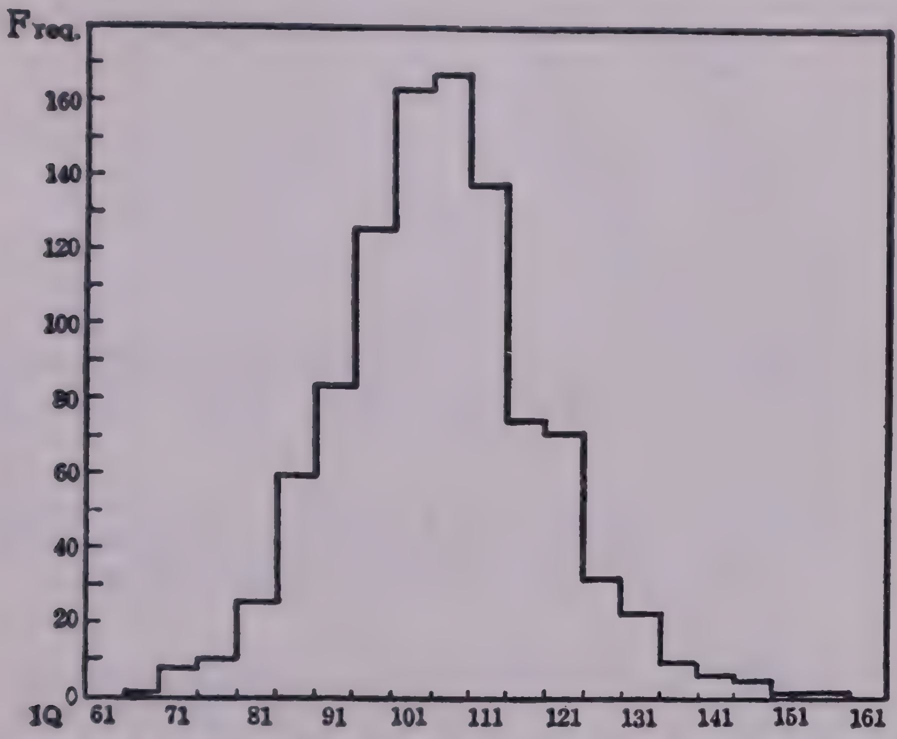

Fig. 25-3. Distribution of intelligence quotients of 1001 first-grade children. (Reprinted from M. M. Wentworth, **Individual Differences in the Intelligence of School Children** *by permission of Harvard University Press.)*

Some examples of variations. In the foregoing discussion, we have stated that the general population is not divisible into distinct types in traits of mentality, personality, or physique. We have maintained, instead, that there is a single type represented by the central tendency and its proximal values, with deviates occurring in both directions from the norm, the frequency of variants decreasing as the distance from the central tendency increases. In this section we shall present representative distributions illustrating the extent of variations in several different traits.

Figure 25-3 shows a distribution of intelligence quotients obtained by examining 1,001 first-grade children with the 1916 Stanford Revision of the Binet-Simon Test. It will be seen that the characteristics of the "normal" curve of distribution are very closely approximated. The

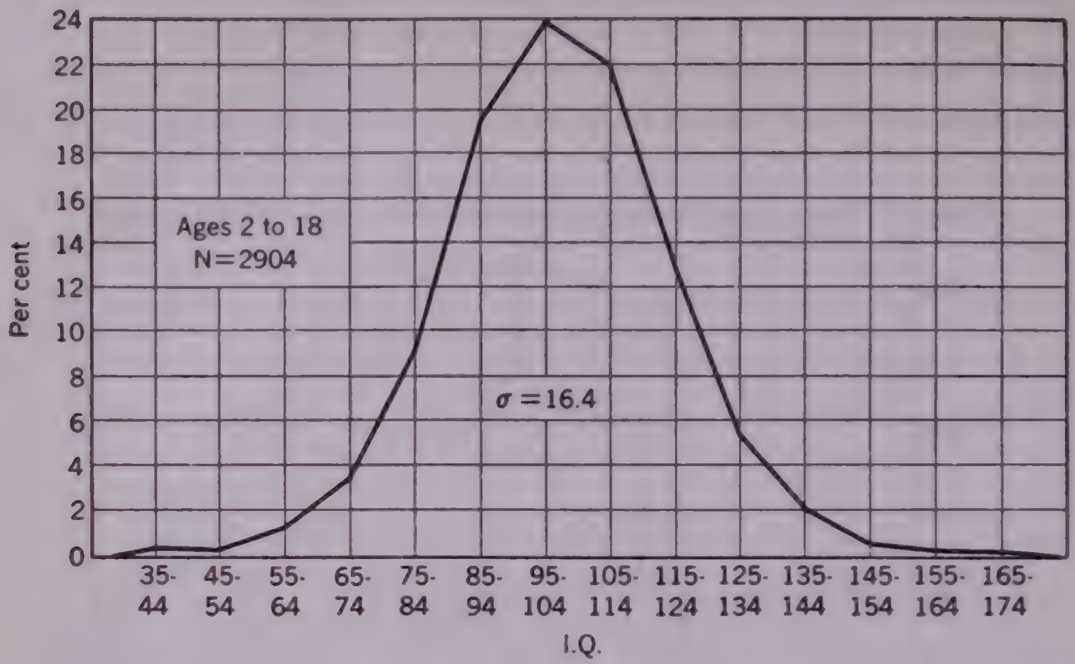

Fig. 25-4. Distribution of composite L—M IQ's of standardization group. (Reprinted from Terman and Merrill, op. cit., p. 37 by permission of Houghton Mifflin Company.)

range of intelligence quotients is from about 60, which represents marked mental inferiority, to about 160, which indicates a very high degree of mental superiority, whereas the central tendency, representing the typical, is in the neighborhood of 100. Similar though not identical distributions are found when tests of intelligence are used with groups at all age levels.

Figure 25-4 shows the distribution of intelligence quotients of the group of children and adolescents used to standardize the 1937 version of the Stanford-Binet scale. It will be noted that, in form, this distribution is very similar to that in Fig. 25-3. The principal differences are, first, that in Fig. 25-3 the curve is based upon a sampling of first-grade children only, whereas Fig. 25-4 covers a wide range of ages, from 2 years to 18 years; and, second, the range of IQ's is greater in Fig. 25-4, going down to approximately 30 and up to about 175.

The "normal" or Gaussian curve is found not only with the complex and varied mental processes known as intelligence, but also when the more specialized segmental processes are studied. In Fig. 25-5, for example, we have a distribution of scores made by 173 students in a test of memory span. Much the same form of curve would be obtained if we were to measure other specialized functions, such as those involved in cancellation tests, copying digits or letters, rate of tapping, finger dexterity, and many others.

The wide range of abilities among pupils of the same grade or of the same age is revealed, also, in objective measurements of achievement in school subjects, as illustrated by the following examples. In a group of more than 2,000 third-grade pupils, the range of achievement in reading was more than six grades; that is, some third-grade pupils (more than 2 per cent) were able to read as well as the average seventh-grade pupils, whereas others (about 29 per cent) read at the second-grade level and nearly 2 per cent were only at the first-grade level of reading competence. The remaining two-thirds of the group were distributed from grade three to six.[2]

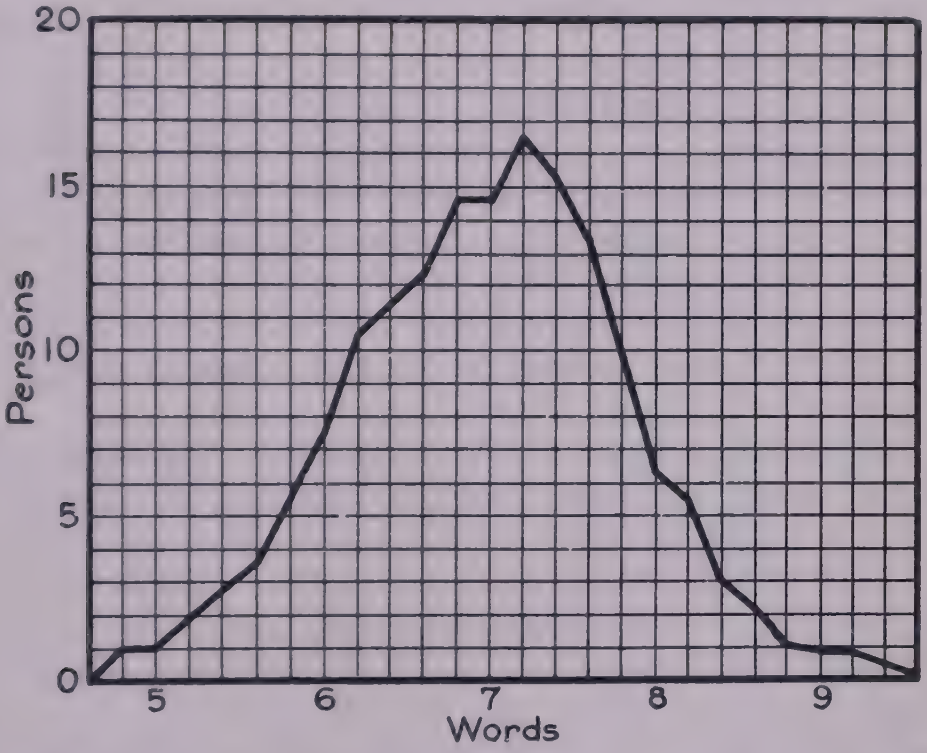

Fig. 25-5. Distribution of memory scores, 173 university students, (Reprinted from D. Starch,* Educational Psychology *by permission of the Macmillan Company.)

Investigations have long since demonstrated that a wide range of abilities in reading is not restricted to elementary-school pupils. A typical report shows that, among 950 freshmen entering a New York City high school, the reading levels attained varied from that of grade three through grades ten and above.[3]

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[2] H. H. Waite, "The Improvement of Reading in the Omaha Public Schools," *The Elementary School Journal,* XLVIII (1948), 305-309.

The same general type of data are found when achievement in other school subjects is studied, as in arithmetical computation. One such investigation showed that a group of about 200 ninth-grade pupils, in the same school system, varied in this ability from the fourth-grade level to that of grades ten and higher.[4]

There are several reasons that account for these very considerable and educationally significant individual differences in school achievement. They may be and often are due primarily to differences in intellectual capacity. Or, in other cases, they may be attributable to different degrees of motivation, length of school attendance and quality of instruction, sensory handicaps (in vision or hearing), physical disabilities (health, nutrition, energy level), or differences in personality and behavioral traits. At times, a pupil's school achievement reflects his status in two or more of these factors rather than in mental ability alone.

Individual differences are significant also in business and industry; numerous studies, therefore, have been made on this subject. The following examples will serve as illustrations. A group of forty-four typists, each of whom had five or more years of experience, varied in speed and skill from fewer than ten words per minute to sixty-five (after scores had been adjusted for errors).[5] Turning now to the machine shop, we find the same general condition. On a test of machine-shop information, the 112 applicants obtained scores ranging from near-zero to the maximum. And even after a group of employees had undergone identical training and had comparable experience, it will be found that they vary considerably in quantity of production. Due to the fact that in business and industry the groups being tested are a selected sampling rather than representative of the general population, we do not expect them to yield symmetrical Gaussian distributions in tests of information and skills. Considerable variation, however, is found, thus illustrating the range of differences in abilites to acquire the information and develop the skills necessary in each of the occupations.

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[3] S. S. Center and G. L. Persons, *Teaching High School Students to Read* (New York: Appleton-Century-Crofts, Inc., 1937).

[4] *Stanford Achievement Test* (Yonkers, N. Y.: World Book Company, 1940).

[5] National Society for the Study of Education, *Education of Exceptional Children*, Forty-ninth Yearbook, 1950; also *Education for Gifted Children*, Fifty-seventh Yearbook, Part II, 1958.

In the measurement of physical traits, the Gaussian distribution was observed before it was found for mental traits. To illustrate: One study of the heights of more than 8,000 men in England showed that they varied from about 58 to 77 inches, with most of these measures falling between 65 and 70 inches. In another survey, on the heights of more than 1,000 women in the United States, the measures ranged from about 55 to about 70 inches. In both of these investigations on height, the curves of distribution were strikingly symmetrical and very close approximations to the "normal" frequency curve.

The "normal" distribution for such measures as those of height, weight, girth of head, and girth of chest strengthened many psychologists in their views regarding a "normal" distribution of mental traits when, in testing these, they obtained curves that were approximately Gaussian. They argued not only from their data, but by analogy as well. Indeed, many investigators today hold that if a given test applied to an unselected population does not yield a close approximation to the Gaussian curve of distribution, either the test is at fault or some extraneous complicating factors have been introduced into the situation. They do not seriously question the validity of the Gaussian as the "true" curve.

There seems to be some evidence, however, that in a few special instances at least, and under present conditions of development, distributions do not conform to the Gaussian or normal probability curve. Figure 25-6, showing distributions of capacities in the sense of pitch, is a case in point. Here the curves do not present a Gaussian distribution, with the exception of adult abilities in pitch (represented by the solid line). It should be observed, however, that the curves do approach the Gaussian more closely as the persons studied increase in maturity. In connection with these curves, Seashore writes[6]:

> The experimental observation of these tones requires a certain amount of information and development of understanding and power of application which come with age. But this does not signify that the ignorant and immature do not actually hear these tones and are not musically affected by them.
>
> The individual differences in the lower limit of tonality are traceable to lack of information and of training in observation, and, in many cases, to the lack of a musical mind rather than to any structural conditions in the ear. [p. 38]
>
> In general, children do not do so well as adults in this test of time.

---

[6] C. E. Seashore, *Psychology of Musical Talent* (New York: Silver Burdett Company, 1919).

Among these factors which account for this are numerous conditions which are different in the group of children from those in a group of adults, such as strain of attention, the excitement, fluctuation of interest and novelty, which tend to operate more adversely for children than for adults. [pp. 110-111]

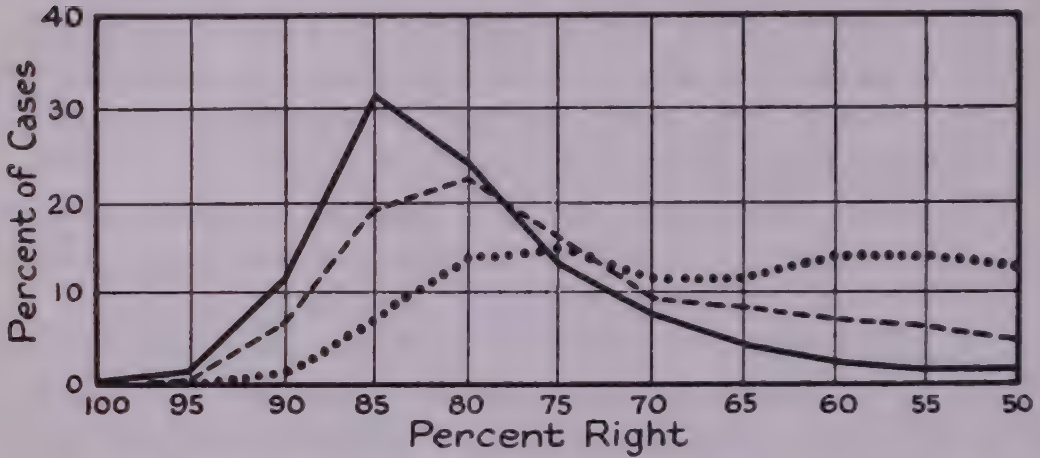

Fig. 25-6. Distribution of capacities in the sense of pitch. (Reprinted from C. E. Seashore, **Psychology of Musical Talent** *by permission of Silver, Burdett and Company.)*

If the foregoing explanations are valid, it is probable that the curves for adults are more nearly representative of actual conditions than are those for children, since the validity of the latter is affected, apparently, by factors extraneous to the capacities being measured. In other words, in the case of adults, the investigators have come closer to measuring the "pure" capacity than in children. It is possible, also, that "distortions" of the "normal" curve in the earlier years might be due to the greater significance of disparities in the children's training, whereas in an unselected group of adults these early discrepancies might have been overcome or minimized with the passage of time.

The important matter is to recognize that under present conditions there are *some* psychological functions or processes that will yield curves of distribution that are not Gaussian. Also, it must be realized that the form of any curve of distribution is in part dependent upon the nature of the measuring instrument being used. Thus, before a curve is judged as "true" or not, the validity of the measuring device should be known.

Another effective manner of demonstrating human variability is to find the extent of overlapping of successive age-groups in a given function or complex of functions. This method shows that although there is a progressive increase in capacity as age increases, until the maximum is reached, the ranges of the several age-groups are not mutually exclusive. The accompanying table (25-1) illustrates this. From this table it is clear that although the factor of chronological age is significant for a group, it is not adequate in itself as a determinant of an individual's position in respect to a given function or capacity.

TABLE 25-1

Distribution of mental ages
Chronological Age

M.A.	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
0	10	6	3	2	0	1	0	1	1	....	....	1			
1	12	11	13	10	6	3	2	1	1	....	1	2	1	....	1
2	17	18	22	11	16	11	8	9	2	6	3	1	0	....	3
3	17	20	15	17	14	12	15	10	6	6	4	2	4	4	1
4	8	25	32	23	31	18	17	9	6	10	3	4	1	1	1
5	....	13	45	53	46	33	16	10	14	6	10	9	4	2	2
6	....	2	14	57	58	62	53	35	17	20	13	11	9	7	5
7	....	....	3	13	55	71	65	66	35	23	25	17	10	9	5
8	....	....	1	4	20	44	90	71	62	64	46	37	28	16	8
9	....	....	....	1	5	35	56	73	78	70	90	62	41	23	17
10	....	....	....	....	3	4	21	45	49	74	80	63	56	30	14
11	....	....	....	....	2	0	8	16	37	32	46	53	43	36	19
12	....	....	....	....	....	....	2	6	19	30	39	55	56	32	20
13	....	....	....	....	....	....	....	6	19	22	30	52	37	32	17
14	....	....	....	....	....	....	....	1	6	11	12	46	37	36	13
15	....	....	....	....	....	....	....	....	1	5	9	34	31	17	18
16	....	....	....	....	....	....	....	....	1	1	3	24	14	14	7
17	....	....	....	....	....	....	....	....	....	2	1	10	4	7	3
18	....	....	....	....	....	....	....	....	....	....	1	1	6	5	1
19	....	....	....	....	....	....	....	....	....	....	....	....	1	2	0
20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
	64	95	148	191	256	294	353	359	354	382	416	484	383	273	156

Total = 4208 cases

Source: L. L. Thurstone and L. Ackerson, "Mental Growth Curve for the Binet Tests," *Journal of Educational Psychology*, XX, No. 8 (1929), 571.

Educationally, this is important, for it means that a pupil's life-age is an unreliable criterion upon which to base his educational program. Today it is a commonplace among educators and psychologists to say that human variability should be given due regard in the content and methods of education. Yet that commonplace was long in coming; and even today it is not universally accepted and is even less widely practiced. In some instances, however, failure to employ the established principles of individual differences is due to practical obstacles rather than to skepticism or opposition.

Variations within the individual. The examples of variations thus far given deal with differences within a group. But it is not enough to know only how far members of a group differ among themselves. The student of human variability—educator, clinician, vocational counselor—wishes to know as much as possible about each person's characteristics, for in the educational process we must deal with the individual as the ultimate unit. If it were true—as it is not—that every person is a well-defined type and that in each type certain fixed trait-relationships exist, the problem of educating humanity would be relatively simple. But, even though marked *general trends* and firm *general principles* have been demonstrated, there are always exceptions, their irregularities being of different degrees. And what is more, until an individual has been studied. we cannot assert that he is or is not irregular in some respect; nor, if discrepancies exist, can the degree be known without investigation. In other words—to borrow a term now popular in psychology—we should have a "picture" of each person if his individuality is to be adequately recognized and educated. A complete psychological portrait would include details of personality traits, interests, developmental history, and environmental forces as well as those of intellectual equipment. In this chapter, however, we are concerned primarily with the last of these, and only incidentally with the others. Yet we are constrained to repeat that the manifestations of intelligence do not occur in isolation from the remaining psychological and physical traits.

The problem of variations within the individual has been studied by means of measuring or otherwise evaluating and then correlating numerous abilities or performances of large numbers of individuals. By this method it has been found that there is always a significant and sometimes a high or a very high positive correlation between the complex mental processes tested—as, for example, in reading rate, reading comprehension, arithmetical reasoning, arithmetic fundamentals, spelling, algebra, geometry, word definition, cancellation tests, information, substitutions, tests of construction and analysis employing many kinds of materials, tests of reasoning with things as well as with words, and still others. The degrees of correlation, of course, are not uniform; nor are any perfect. Then, too, there are a few functions that show only a very low correlation with capacities in other fields.

Such "special abilities," for example, are the elemental sensory and motor capacities in music and graphic reproduction.

The fact that most mental processes—as manifested in tests and examinations—reveal positive correlations of varying degrees of significance means that abilities within persons in general do not occur in a haphazard fashion. Instead, there is a tendency for individuals to approximate the same general levels of ability in many mental functions. That is to say, other things being equal, in most persons we may expect a marked degree of consistency of performance in different fields, with the exceptions noted. Unfortunately, however, "other things" are often not equal.

When profiles of pupils' school achievement, objectively measured, are determined, it is found that some are highly consistent, others are fairly consistent, whereas still others may show rather striking inconsistencies. The significant positive correlation coefficients reveal that, on the whole, pupils tend to deviate in the same direction from the group means in nearly all their subjects of study. There are instances of pupils who are wholly uniform in their performance in history, reading, arithmetic, English composition, and so on, whose profiles show almost no irregularities. If profiles of this kind were universal, or nearly so, we should find much higher and more uniform correlation coefficients than we actually do. Such profiles are, however, not uncommon; and their occurrence accounts in part for the positive correlations that exist. On the other hand, there are instances of pupils whose profiles reveal one or more large inconsistencies—as, for example, that of a pupil who is very superior in all studies involving arithmetical manipulation, arithmetical reasoning, and science, but who is only mediocre or slightly above average in language usage, spelling, and literature. If instances of this kind were the rule, or much more frequent, then the correlation coefficients between the several fields of study would be lower than those now found. These instances do, however, help to lower the coefficients.

The presence of marked inconsistencies would be shown in the "profile" by appreciable fluctuations in the lines connecting the points representing the levels of the several subjects. Some of the most outstanding inconsistencies are found between ordinary school subjects and general intelligence, on the one hand, and the elemental sensory and motor capacities of music and the graphic arts, on the other. Figure 25-7 shows such a case. Here we have a child of very

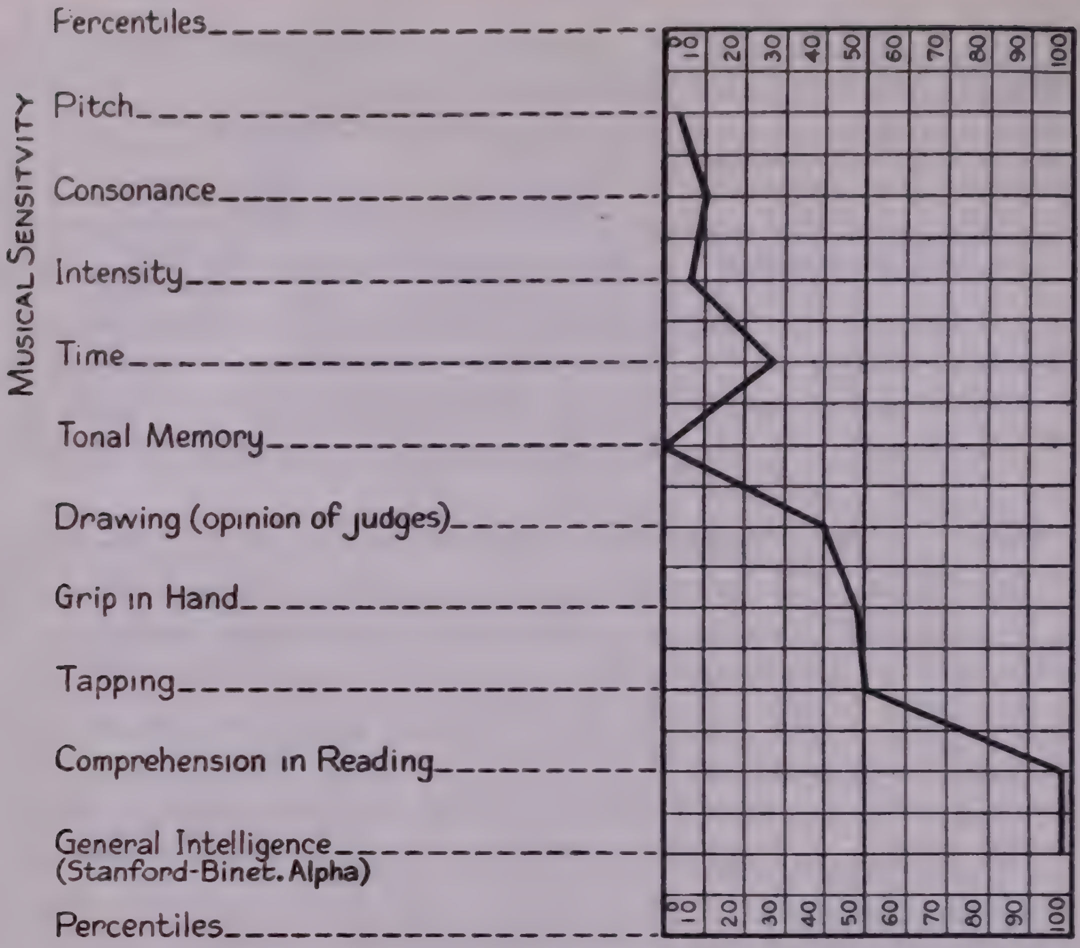

Fig. 25-7. Psychograph of a child of very superior intelligence with a special defect in music. (Reprinted from L. S. Hollingworth, **Special Talents and Defects** *by permission of the Macmillan Company.)*

superior intellectual ability as shown by results obtained with the Stanford-Binet and the Army Alpha tests, for he is in the highest one or two per cent of the school population indicated on the "profile." Yet this same child falls in the lowest ten per cent of the group in four of the five tests of musical sensitivity, and in the third lowest decile-group in the fifth of these tests (time). In drawing, also, he is below mediocrity. In strength of grip and in rate of tapping—simple motor tests that may be of importance in certain more complex activities—this child is at the average level. The discrepancies between his rank in musical sensitivity tests, motor activity, and functions involving the use of signs and symbols—abstract intelligence—are striking. Cases such as this cannot be revealed by group data; they are discovered and understood only when full data for the individual are available.

Figure 25-8 is a profile of percentile ranks of a fifth-grade boy, obtained with the Chicago Tests of Primary Mental Abilities. It is apparent that this boy is inferior in respect to the six tested abilities, as compared with his own age group. His own highest rank is in the test of verbal meaning (percentile rank 28), whereas his lowest is in number facility (percentile rank 7). Yet, in spite of the difference in percentile ranks between his two extreme scores, we are justified in concluding that this is a generally inferior boy with respect to the measured abilities, because in all of them he is significantly below the average of his age group (this being percentile rank 50).

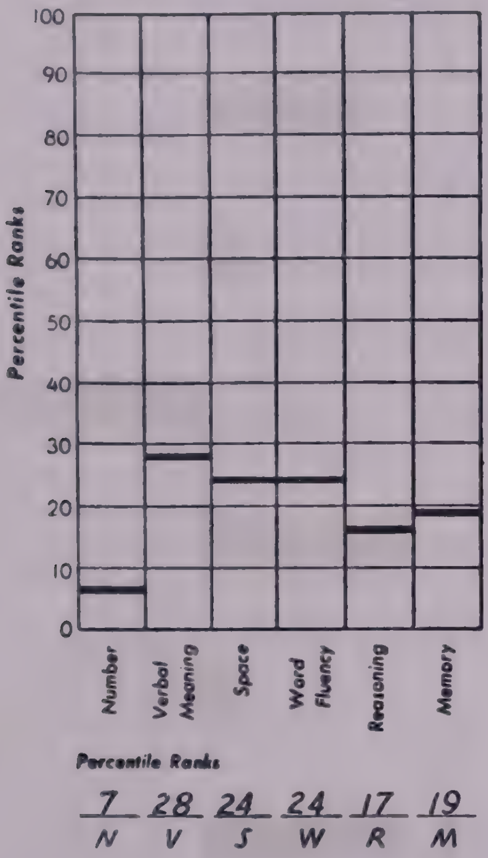

Fig. 25-8. A profile of percentile ranks of a fifth grade boy obtained with the Chicago Tests of the Primary Mental Abilities.

Figure 25-9 is still another individual profile. It differs from the preceding one in that this pupil is very significantly above average in all but three of the aptitude tests, in two of which he is slightly above (percentile rank 60), whereas in one, clerical, he is markedly inferior (percentile rank 15).

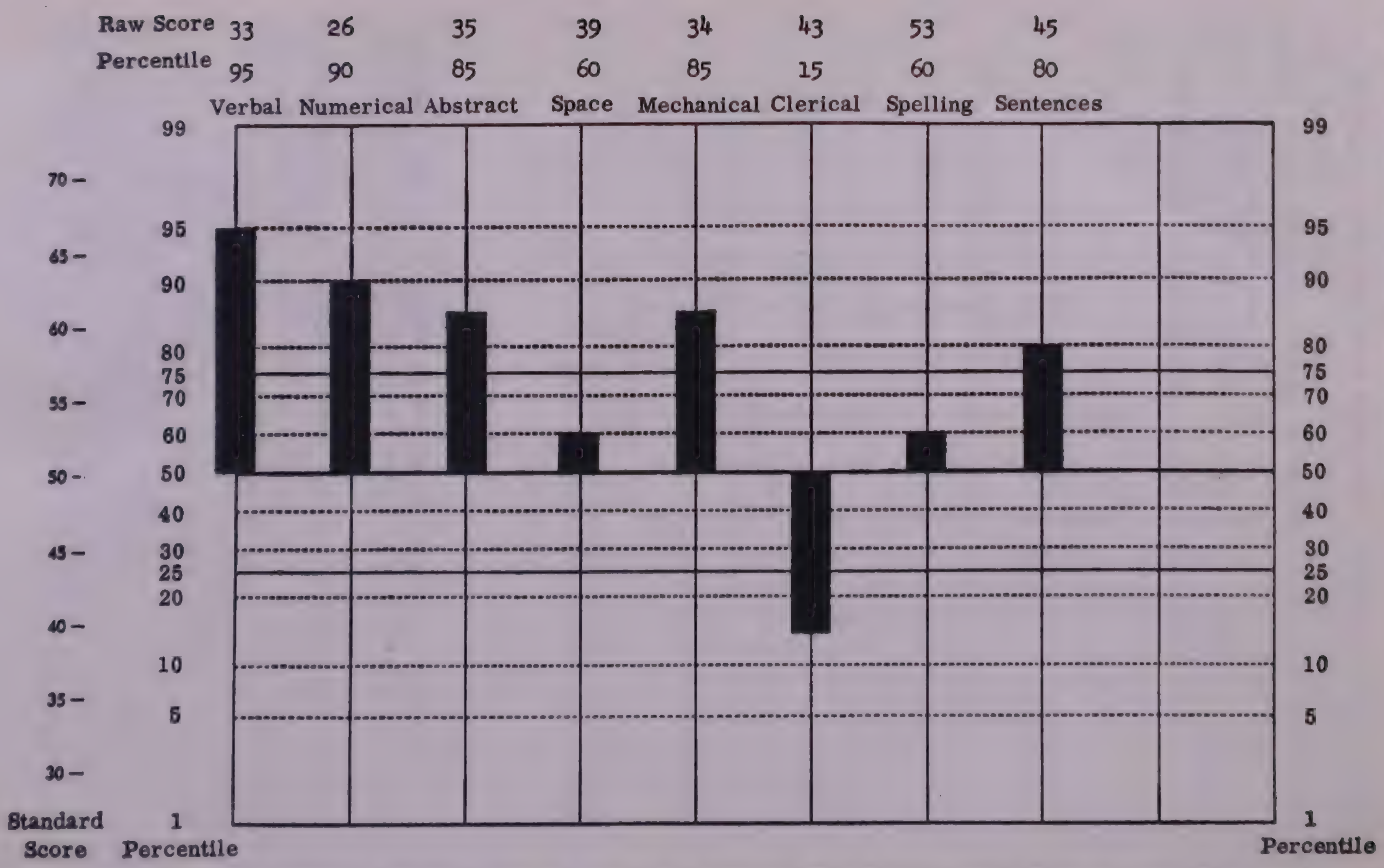

Fig. 25-9. *Differential aptitude tests: a profile of scores. The Psychological Corporation.* (By permission).

It would be a mistake to assume that lack of consistency of abilities in some instances proves mental antagonisms or compensations to be the rule. It has already been stated that there is a significant degree of agreement of the levels of practically all mental traits possessed by a person, as shown by the magnitude of the positive correlations. But one's abilities are not all uniform; if they were, statistical analyses of measurements would yield a *perfect positive* correlation, whereas in fact the coefficients are, in varying degrees, less than 1.00. On the other hand, if it were true that mental antagonisms or compensations are the rule, or are found more often than not, analyses should yield marked *negative* coefficients. If there were no correspondence—that is, if abilities within the individual were associated in a haphazard manner—we should find *zero* correlation coefficients. Neither of these last two conditions is found.

The systematic study of the nature and extent of individual differences has, until the present time, been largely cross-sectional in character, employing one variable at a time. By this method, a representative group of individuals is measured with respect to a given trait, such as intelligence, height, strength, reading rate, and so forth. The data are then arranged in a frequency distribution and analyzed, and the relative rank of an individual is determined by his position in the group. This type of study has been and still is very valuable, but we must realize that a single measure does not portray an individual. Nor is a *series* of such measures, taken at a given time, altogether satisfactory; for although such a series provides a psychological "profile," it does not show the dynamic interrelationships of an individual's various traits; it does not give the "organismic" picture that is so essential. No trait exists in isolation within a person; every trait is a dependent part in a larger whole that acts as a unit; it is this whole that gives every person his uniqueness. To portray this uniqueness, investigators have been employing the *longitudinal* method, in which the *same* individual is measured and studied over a period of some years in respect to each of a variety of traits. Thus, each individual's tempo and peculiarities of development are portrayed. After this is done, it is essential to organize all the pertinent facts into a whole and to attempt an interpretation of them in order best to understand how that person came to be what he is. In short, the cross-sectional normative study can be used to discover resemblances and differences among individuals, while the organized individual total pattern can be used to explore and appraise more fully the individuality of each person.

Special abilities and disabilities

Elsewhere in this book, the special problems of learning, by children variously handicapped, are presented. These problems, however, are relevant also to the subject of individual differences, since a child's special defects, if any, as well as his special talents or skills, contribute to an emphasis upon his individuality and upon the necessity of some differentiation and individual provisions for his education.

It has already been indicated that, although abilities within the individual are not perfectly correlated, the degree of correspondence (correlation) in the large majority of cases is sufficiently high and positive to warrant the view that an individual's performance in each of the several school subjects should not seriously deviate from one another. There have been numerous studies of correlations between intelligence test ratings and achievement in school subjects. The following coefficients are the approximate median coefficients for the basic school subjects:

arithmetic	.55
reading	.60
spelling	.50

Coefficients of the same general order are found when intelligence test results are correlated with specialized subjects such as history, geography, and sciences, for, after all, these subjects involve, among others, the same mental functions as do the basic subjects, the so-called "tool" subjects.

There are exceptions to the rule that a person is about equally good, mediocre, or poor in all mental abilities. Variations, when they occur, are found principally in arithmetical (and mathematical), linguistic, mechanical, graphic, or musical abilities. Of these, the musical and graphic have the least relationship to general intellectual level; the mechanical is more closely related, but the association is not nearly so marked as in the case of linguistic and arithmetical abilities.

Of these five, in fact, only the musical and graphic appear to have a legitimate claim to being called *special abilities*. Their designation as such rests largely upon the fact that they require fortunate combinations of a number of specific mental factors which, within the individual, vary independently among themselves and independently of general ability.[7] It is essential, however, if a person's achievements in these activities are to surpass the more mechanical aspects—such as reproduction or competent performance—that the specific factors of each aptitude be complemented by general intellectual ability of an appropriate level. In this connection it is noteworthy that in the study of gifted children, directed by L. M. Terman, it was found that nearly all children who demonstrated exceptionally high aptitude in music, graphic arts, or mechanical inventiveness also had very high IQ's (140 or higher). Conversely, although there are occasional exceptions who attract attention because they are exceptions, the mentally retarded and the mentally deficient as a group are inferior in music, art, and mechanical aptitude.

It is true that in a very few cases there are special aptitudes in the linguistic, arithmetical, or mechanical fields which, as in the case of "lightning calculators," cannot be ascribed to external or accidental causes. As an explanation of these, psychology has disclosed the operation of unusual imagery of various kinds, well-developed mechanics, short-cuts, extensive memorization of number combinations, strong interest and motivation, much time spent in practice, and a long perception span. But in general, arithmetical and linguistic abilities are well correlated with general competence.

In arithmetic and language, and their related subjects, if learning disabilities exist in otherwise able individuals, it is usually found that the cause is one of poor habits, poor preparation in the mechanics of the subject, sensory or other physical handicaps, poor instruction, lack of motivation, or emotional factors of personality. In a very small percentage of cases, disabilities in reading and other aspects of language are attributable to defects in the central nervous system, as yet not at all well understood, which make it very difficult for an individual to perceive correctly, retain what has been perceived, and to reproduce correctly. This condition, fortunately infrequent, may be found in children within a wide range of intelligence, including superior levels.[8]

There is a popular misconception that mentally gifted children show a high degree of specialization of abilities, that their superiority is attributable to a few special abilities. This is not the case. Although superior and gifted children vary to some extent in regard to their several abilities within themselves (intra-individual) and among themselves (inter-individual), Terman and his colleagues and other students of these exceptional children have been impressed by their *general* superiority; by their versatility.[9] Conversely, the mentally retarded and deficient are not inferior merely because of one or two specialized disabilities. They are, on the whole, retarded in varying degrees in all the functions measured by tests of intellectual ability and in school subjects of study.[10]

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[7] F. S. Freeman, *Individual Differences* (New York: Henry Holt & Company, Inc., 1934); F. L. Goodenough, *Exceptional Children* (New York: Appleton-Century-Crofts, Inc., 1956).

[8] W. Cruikshank (ed.), *Psychology of Exceptional Children and Youth* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1955).

In the study of special abilities and disabilities, and even of prodigies, one cannot but be impressed by the small beginnings or initial handicaps from which serious disabilities may develop in the course of time, or the relatively small initial advantages which, when combined with zeal and competent instruction, may eventuate in very large final differences such as to constitute, in effect, special abilities.

Causes of individual differences

Heredity-environment. Until approximately 20 years ago, the question of whether heredity or environment was the more significant in producing individual differences in mental abilities was a moot one. It was much discussed, debated, and investigated by means of the best available scientific methods. There were some psychologists and biologists who ascribed almost complete responsibility to heredity, while attributing little influence to environmental factors. On the other hand, there were some psychologists, relatively few in number, who gave primary significance to the environment and only a secondary role to heredity.[11]

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[9] P. A. Witty (ed.), *The Gifted Child* (Boston: D. C. Heath & Company, 1951); L. M. Terman, *et al., Genetic Studies of Genius* (Stanford: Stanford University Press, Vol. I, 1926; Vol. III, 1930).

[10] M. D. Brown, "Variation as a Function of Ability and Its Relation to Personality and Interests," *Archives of Psychology*, No. 262 (1941); A. Magaret and C. W. Thompson, "Differential Test Responses of Normal, Superior, and Mentally Defective Subjects," *Journal of Abnormal and Social Psychology*, XLV (1950), 163-167.

[11] F. S. Freeman, *Individual Differences* (New York: Henry Holt & Company, Inc., 1934); N. Pastore, *The Nature-Nurture Controversy* (New York: King's Crown Press, Columbia University, 1949); G. D. Stoddard, *The Meaning of Intelligence* (New York: The Macmillan Company, 1943).

The heredity-environment question (also named nature-nurture by Francis Galton) has been under scientific investigation since the 1860's, when Galton began his studies of English men of "genius" and English men of science. It should be evident that an answer to the problem of the relative importance of one's inheritance of mental capacity as compared with the effects of environmental influences is of primary significance and consequence to society in general and to educators in particular. The answer is especially meaningful to educators in a democratic society that provides universal free education, based upon the social doctrine that every child should have an opportunity to develop his capacities to the full. One can subscribe to this doctrine whether he is an "hereditarian" or an "environmentalist." The differences between these two groups arose, however, in interpreting the extent of the effects of education upon children whose mental abilities rank them at one or another of the several levels.

The "hereditarians" maintained that education could not increase capacity; it could only provide one's intelligence with materials to operate on and with, and that, as a matter of fact, "natural" individual differences would find expression and be manifest regardless of kind and amount of formal education; for intelligence is a complex dynamic psychological operation that acts upon, utilizes, and exploits the environment, in varying degrees, depending upon its quality and level. Education, then, becomes a process of providing children with opportunities to acquire certain information, techniques, skills, and opportunities to utilize whatever learning and creative capacities they have. The amount and kind of education, therefore, to be provided each child will depend upon his innate capacity to learn.

The more extreme "environmentalists," on the other hand, maintained that innate individual differences in *potential* mental abilities are not very great, except for extreme deviates; that with equal cultural and educational opportunities the mental abilities of most children could be raised considerably; that the greatest part of individual differences was attributable to discrepancies in cultural and educational opportunities. It would be maintained from this point of view that most children of inferior mental levels have suffered cultural and educational "deprivation"; that if "equal educational opportunity" were provided for all children, then the intellectual achievements of most children could be greatly enhanced, if their degree of motivation were also strong enough.

For about twenty years now, neither the extreme hereditarian nor the extreme environmentalist doctrine has prevailed. The viewpoint now accepted by the large majority of psychologists is that of "interaction." This simply means that both nature and nurture are important and interact in any individual's development; that heredity does not operate in a vacuum and that environment must have biological, that is, genetic materials (heredity) to work with and upon; that neither nature nor nurture can be regarded as more important than the other, since the one can have no significance or existence without the other; that the environment actually nurtures, helps develop, and helps to build mental functions in the same sense that one's food and diet are operative in developing physique. This principle of interaction signifies that nature sets the limits of an individual's development in regard to various psychological functions (his potentialities), but nurture is equally important in determining the extent to which his potentialities shall be realized, the specific forms in which they shall be developed, and the directions in which they shall be utilized.

For educators the interaction principle signifies that every child should have optimal cultural and educational opportunities if his potentialities are to be fully developed, even though he may ultimately reach only an inferior level. On the other hand, it also follows that children who have potentialities for learning and achievement at the superior and gifted levels must likewise be provided with the cultural and educational opportunities for their development and realization. The doctrine of interaction does not mean that all children would be able to learn and achieve equally well if only opportunities were equalized. A wide range of individual differences will still appear even under the best educational practices; but these would be due to differences in potential capacity rather than to advantages in or handicaps to development. It follows that "equal opportunity" for education does not mean sameness and uniformity. On the contrary, it means differentiation in content, methods, and duration; it means education for each individual according to his capacity to benefit and develop from schooling.

Methods of investigation. We shall not here go into the details and findings of researches on the problem of heredity and environment. It is our purpose only to indicate the types of study, which should help to make clear the reasons why the "interaction" viewpoint prevails. First, the types of research will be listed. This will be followed by a brief, general interpretation of the findings.

1. Studies of family resemblances between siblings and parent-child
2. Studies of twins, both identical and non-identical (fraternal)
3. Environmental conditions (quality) and later (adult) achievement
4. Environmental conditions and mental level in childhood
5. Children's mental level in relation to parental occupations
6. Effects of nursery attendance
7. Effects of training upon individual differences
8. Improvement of foster and institutional children
9. National and racial differences
10. Sex differences
11. Differences due to age

What, in general, have these studies revealed? Sibling and parent-child resemblances in mental abilities are quite marked, as represented by a correlation coefficient of about .50, whereas if scores of unrelated paired children were correlated we should expect a true coefficient of zero. Thus, we have evidence here of the influence of heredity, even though a coefficient of .50 is far removed from unity (1.00). When scores of fraternal twins are correlated, the median coefficient is approximately .70, thus indicating the influence of *both* heredity and environment, since genetically unlike twins need be no more alike than ordinary siblings for whom the correlation coefficient is .50. The difference between .50 and .70 is attributable to similarities in environments of the fraternal twins. Scores of *identical* twins, however, correlate between .85 and .90, again showing the importance of the hereditary factor. Yet, when identical twins are reared apart, from an early age and in environments of appreciably different quality, the correlations are significantly smaller (about .75), and IQ differences are significantly large, ranging often from 10 to 25 points. Again, considering these data together, we infer that both nature and nurture have been effective in producing the results.

Studies also have been made of ordinary siblings reared apart. In such instances the usual coefficient of correlation between their ratings drops to about .30. And equally significant is the fact that *unrelated* children brought up in the same home from early childhood show a correlation of .25–.35, thus indicating the influence of a common environment.

Much the same kinds of nature-nurture interrelationships have been found in the other types of studies listed above. Children whose parents are in the higher occupational levels have, as a group, better hereditary potentialities, since there is a positive relationship between mental ability and type of occupation. But, in addition, their economic status is such that in general their cultural and other developmental conditions are superior to those of children whose parents are in lower occupational groups.

Furthermore, it has been found that children who are reared in environments that are especially impoverished (for example, canal-boat children and gypsy children in England, children in remote mountain areas in the United States) are adversely affected in the development of mental abilities. Conversely, children who have had the advantages of experiences in a well-conceived and well-run nursery school show some advantage over matched groups of children who have not. And, in this same area of research, illegitimate infants reared in institutions of superior quality have developed intelligence quotients much higher than would have been expected on the basis of what was known of their mothers' mental levels and, when obtainable, of their fathers'.

National origin and racial membership. The question of whether or not there are significant innate differences in mental abilities among the several racial groups and among the various national groups has occupied the attention of many psychologists, biologists, anthropologists, and sociologists. This question has been a matter not only of scientific interest but of political and social importance, significantly influencing legislation as well as social and educational practices. And it still is a question of practical importance, although not so much as formerly. Children, adolescents, and adults of the several racial groups have been tested in many parts of the United States. Individuals representing many national groups, both oriental and occidental, of a wide range of ages, have been given psychological tests in this country and abroad. In this area of research, it is very difficult to obtain unequivocal results because it is difficult or impossible to control all important factors, or variables, that affect the findings. However, there are converging lines of evidence; the data are sufficiently sound and extensive to warrant the following conclusion.

So far as national groups (for example, English, French, Scandinavian, Italian, Russian, and so forth) and the subgroups of the Caucasian race ("Nordic," "Alpine," and "Mediterranean") are concerned, there is no valid evidence to warrant the belief that any one or more of these are innately superior to the others in regard to mental capacity. Available research findings strongly indicate that manifested group differences in measured abilities are attributable to environmental factors: cultural, educational, and probably physical nutrition. Furthermore, in all these intergroup comparisons, although there are greater or lesser differences in *averages*, the more important results are these: (1) there is very considerable overlapping of the distributions of scores when any two groups are compared; and (2) individual differences *within* each group are very much greater and of much more significance psychologically and educationally than are the differences in group averages.[12] Thus, so far as education is concerned, it is the individual who must be considered, regardless of his origins.

Studies of racial differences in intelligence in the United States have dealt with members of the white population as compared with non-white persons, principally Negroes. Less often the studies have been concerned with North American Indians, Japanese, Chinese, and occasionally other groups. Data obtained over a period of many years, by means of psychological tests, have rather consistently ranked white *groups* of persons above non-white. Originally and for a considerable period of time these significant differences in group averages were interpreted as indicating innate superiority of the white population, as a whole, in regard to mental capacity. Among the non-white groups there were, to be sure, those who scored at the superior or, in some instances, at the gifted levels. But since their numbers were relatively smaller than the percentages of comparable individuals in the white groups, and since only about 25–30 per cent of the non-white groups reached or surpassed the average level of the white groups, many investigators concluded that innate racial group differences in intellectual capacity did in fact exist.

Subsequent to these earlier interpretations, the research studies on environmental factors in general, such as those already mentioned, began to modify the thinking and conclusions of many students of the question. More particularly, some investigations were conducted on environmental factors as they are specifically related to each of the non-white groups. It was found, for example, that Negroes living in the North were, as a group, mentally superior to those living in Southern states; and that Negro pupils' length of residence and school attendance in Northern states are positively associated with their intelligence test ratings. These results can be and have been interpreted in two ways: (1) a process of *selective migration* was operative, so that Negroes moving to the North were, on the average and to begin with, of higher mental ability and potential than those who did not migrate; or (2) superior educational and other cultural opportunities in Northern communities account for the higher test scores of Negroes living in the North. At the same time, however, test ratings of white children in the same Northern communities are, on the whole, higher than those of their Negro fellow pupils.[13]

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[12] F. S. Freeman, *Individual Differences* (New York: Henry Holt & Company, Inc., 1934); L. E. Tyler, *The Psychology of Human Differences* (rev. ed.); (New York: Appleton-Century-Crofts, Inc., 1956).

As a matter of fact, *both* interpretations stated above might apply. There *could* have been selective migration; and improved educational facilities *could* have been operative upon those who came to live in the North. Then, too, the higher test scores of white children *might be* attributable to innate biological differences or to the fact that white children, on the whole, have better educational facilities (including preschool and kindergarten) than do Negroes even in the same communities. This could be true in large cities; but it is much less likely to be a factor in a small or moderate-sized community whose schools are of comparable quality throughout and where no schools exist exclusively, or almost so, for one racial group or another.

What may be concluded from the numerous investigations and the mass of data collected on this question? It is difficult, indeed impossible. to untangle and isolate innate biological from environmental factors. And this condition will probably always prevail, since it will hardly be possible to conduct the kind of scientific experiment whereby these two sets of factors can be separated and independently evaluated. Then why devote time and effort to the question? As already stated, this was an interesting scientific problem that also had important political and social implications. And, in spite of scientific difficulties and uncertainties, in the course of the years during which numerous relevant studies were made, research methods were improved as a result of experience. But probably more important is the fact that the findings do show that level of *effective functioning* intelligence can be improved through improved education in nearly every person regardless of racial membership or initial capacity.

With regard to the nature-nurture problem, as it relates to all relevant issues, including the question of racial differences. we may conclude: *Extent and form of mental development are dependent upon interaction*

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[13] F. S. Freeman, *op. cit.*, Chap. 5; L. E. Tyler, *op. cit.*, Chap. 11.

between the individual's biological (genetic) potentialities and upon conditions or factors in his environment during his developmental period of life; especially during the years of infancy and early childhood.

Effect of training upon individual differences. Individual differences in capabilities can be discovered only through their various manifestations and by measuring or otherwise evaluating the amount of variation in proficiencies of one sort or another. Obviously, education and environment are accountable for a portion of this proficiency: hence it is important to know what effect identical training will have on performance.

The methods of studying this problem involve important questions of statistical technique, upon which one's interpretation of results will depend. But, in general, several facts emerge. There is a tendency for less able persons to gain more in proportion to their initial performances than do the more able. In that respect, then, it would seem that initial differences are reduced, since results indicate greater efficacy of training in the case of initially poor abilities. On the other hand, although relative differences are reduced, *absolute* differences may be and most often are increased. It is impossible to say at present which of these results is more important. But educationally and psychologically it is significant to know that individuals of poorer ability tend to make the greater relative gains, and that even those in the top ranks make very significant progress under training. The outstanding fact is the universal and significant improvement achieved under systematic and equalized practice.

Experiments on this problem emphasize the importance of education—in the broadest sense—in the determination of differences in performance, so often attributed to "pure" innate variations. Tests of intelligence are tests of certain kinds of performance. Therefore, if the results they reveal in regard to individual differences in intelligence are to be properly understood, it is necessary to take account of variations in opportunities for intellectual nurture as well as differences in genetic constitution.

The factor of age

Constancy of relative rank. In another chapter of this volume the problem of mental growth is presented. For our present purposes, we wish merely to make note of several important items insofar as they help us understand the individual.

Individual differences in rate of mental growth are manifested in infancy, and growth conforms to a certain order of succession. Although the facts of variation and orderliness of growth in infancy and very early childhood have been established, it has been satisfactorily demonstrated that very early manifestations of mental capacity are not reliable indicators of future courses and levels of development; that is, manifestations prior to the age of eighteen months.

In the case of children with whom the same standardized tests were used over a period of years, after the age of three, but more often after the age of five, the constancy of growth has been studied in terms of intelligence quotient constancy. The maintenance of relative rank among children is very marked but not universal. Correlational studies, using two or more sets of data for the same group of individuals, have yielded coefficients between + .60 and + .95, the average being about + .85. These high coefficients mean that children tend, by and large, to maintain their positions with respect to the whole group, provided no serious changes occur in their conditions of development. In some instances there will be serious discrepancies; but the causes—intrinsic and extrinsic—cannot be known until each case is examined. Nor can we predict who will fail to show constancy of growth. Thus, individuality once more asserts itself, even though a generalization for the group is well established.

Decline in abilities. It is a matter of common observation that late in life persons suffer a decline in mental abilities. Detailed study has revealed that decline proceeds gradually at first, increasing in rate after the age of sixty. The most noteworthy fact for our purposes is this: Although nearly all persons show a decline in mental level in the seventh decade and thereafter, there is a strong likelihood that they will maintain their relative positions with respect to their age groups until close to the end of the life span.

Viewing all available relevant data on mental development, it is concluded that individual differences in mental abilities are not the results of haphazard or capricious growth. Provided there are no untoward circumstances, an individual tends to maintain his relative position of mediocre, superior, or inferior capacity, as determined by the integral character of his genetic constitution, and the conditions of his development.[14] This fact, it is obvious, has significant practical implications in educational planning, selection of pupils, and individual guidance both academically and occupationally.

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[14] The student should note that we have said "capacity," not "performance" or "ability." These last two are always affected by an individual's non-intellective factors of personality, usually spoken of as "motivational" and "emotional."

Differences due to sex

Former belief in woman's inferiority. For many centuries and until relatively recent years, it was believed that woman is by nature intellectually inferior to man—a view probably held by some today. This erroneous notion had its effect, of course, upon the kind and extent of education provided for girls and women, and upon women's actual achievements in all fields of activity. Consequently, failing to give weight to educational and social differences enforced upon girls and women, many maintained that individual differences in mental abilities were in part attributable to innate sex factors. This error was especially prominent in the contrasts drawn between the relatively high degree of outstanding achievement among men as compared with that of women.

General intelligence. The notion of male superiority has been discredited so far as general intellectual ability is concerned. Numerous studies have shown that there are slight and unreliable differences in average intelligence quotients of school children. Where the numbers of each sex are large enough to be representative, the average IQ's for each sex are very close to the expected 100.

Sex differences in specific traits. Practically all investigators have found a small but consistent superiority of females over males in linguistic ability. In number concepts and arithmetical ability, including computation and reasoning, although the results are not so unequivocal, the weight of evidence is on the side of a small difference in favor of the male group. In tests of memory, girls as a group appear to be somewhat superior to boys. In manual performance and in mechanical ability, males, in general, surpass females.

It must be pointed out, however, that sex differences in the foregoing traits apply to group averages. There is in each of these, particularly in the first three, great overlapping between the sexes. Wherever overlapping is found, it is simply impossible by virtue of group membership alone to characterize an individual with respect to a given trait without somehow measuring or otherwise ascertaining that person's degree of the trait.

The presence of a true even though small group difference at an early age may operate as an influencing or directive factor contributing or giving rise to interests, preferences, habits, and educational and vocational emphasis. Thus originally small, manifested differences may be enlarged into permanent and significant ones, such as those found between adult members of the sexes. The disparities in the end-results must, therefore, be attributed in a marked degree to cultural influences that differentiate between boys and girls, men and women. Important among these cultural factors are home influences, parental attitudes, and social expectancy, with consequent effects upon motivation and achievement.

Educational implications

By the time children enter the first grade, differences in abilities are already marked, and absolute variations become more pronounced as they progress. Whatever the reasons for these diversities, the fact is that the school should deal with them by means of differentiated curricula and individualized instruction as far as is feasible.

Because most abilities are well correlated, a pupil, other things being equal, should not vary widely and capriciously in the several subjects, although uniformity need not be expected. However, there are some children whose abilities are rather irregular, owing to genetic or physical factors, habits, interests, purposes, or environmental background. Ideally, then, it is the school's responsibility to find not only each child's general intellectual level, but to discover his special aptitudes or weaknesses, if he has any. This may be achieved through careful observations by teachers, educational tests (achievement, diagnostic, prognostic), or special clinical examinations, or any combination of these. Diagnosis may be directed to the discovery of difficulties or aptitudes in special fields—such as arithmetic, reading, or music—as well as to the determination of a general educational program.

Provision for individual differences does not end with differentiated curricula, for within the same course of study and within the same subjects there are appreciable differences in aptitude. This is particularly true in the so-called universals or constants that are prescribed for practically all pupils. It becomes necessary, therefore, to provide means of instruction that will meet pupils' special needs not only with respect to fields of study but also to rate of progress, extensity and intensity of study within those fields, and the degree of flexibility and independence permitted to the pupils. The customary method of satisfying the second condition is to classify or group pupils into sections on the basis of ability, such as superior, average, or inferior, with gradations between, where facilities permit. Though important, such grouping is only a first step that makes it easier to initiate instruction that comes closer to meeting individual needs.

This is not the place to debate the social implications of such a method of procedure. But it can be stated that where ability grouping has been intelligently made and methods and subject matter adapted, the psychological and educational advantages have been impressive enough to commend the practice to a large majority of educators who have had experience with it. Whatever the details of the particular scheme may be, educators should be conscious of and attempt to provide for diversities of ability, interest, and purpose, and other complicating factors of individuality, such as temperament and physical abnormalities. Otherwise, the alternative of mass instruction will fail to foster and conserve superior abilities and special talent, as it will fail to bring to expression the limited capacities of inferior children.

Although it is a major task of the schools to discern and cultivate superior and creative intellects, and to bring the subnormal to their maximum levels of effectiveness, it is nevertheless true that the many individuals compassed within the "average" group also present definite idiosyncracies. In a literal sense, everyone is exceptional; although classifications are possible with respect to a given aspect of individuality, and although there is a concentration of cases about the central tendency in a given trait, it is the integration of numerous and varied characteristics that gives a person his individuality. And with the exception of identical twins, the probability is extremely remote that any two persons will be alike in all respects. The psychological fallacy of undifferentiated or mass education is, therefore, apparent.

Although each child is, as a whole, unique, it is also true that practically all children have much in common. They have the same kinds of basic psychological needs. Children of several different general mental levels may have in common certain specific skills, abilities, and interests. Children of most levels may share the same attitudes and values. Indeed, in many children the similarities are greater than the differences.

As might well be expected, pupils presenting the most serious educational problems in regard to content and methods of instruction are those at the more extreme ends of the distribution, that is, the very superior and gifted at one end of the scale, and the seriously retarded and mentally deficient at the other. We shall present a brief discussion of the psychological characteristics and educational needs of each of these deviant groups.

The very superior and the gifted

Frequency. Psychological classifications are a matter of definitions of the classes being considered; there are no hard-and-fast lines to separate one group from another, since psychological characteristics are distributed in a continuum.

Psychologists have defined the "very superior" and the "gifted" groups in terms of intelligence quotients. Although all classifications are not in complete agreement as to upper and lower limits, the following groupings are not uncommon. These percentages are based upon the distribution of IQ's of the 1937 Stanford-Binet standardization group.

IQ	*Per cent*	
160 and above	0.03	(gifted)
150–159	0.2	
140–149	1.1	
130–139	3.1	(very superior)

Otherwise stated, these data mean that we may expect to find, on the average, only three pupils in 10,000 who have IQ's of 160 or higher; one in 500 having an IQ between 150-159; slightly more than one in 100 with an IQ of 140-149; and slightly more than three in 100 with IQ's of 130-139. If we classify as "gifted" those with IQ's of 140 and higher, then we may expect to find 1.33 per cent of the general school population in that category, or somewhat more than thirteen among 1,000 pupils. If we add the "very superior" group, we have 4.33 per cent of the total, or a number somewhat greater than forty among 1,000 pupils.

These *percentages* are small; hence some educators and laymen have argued that to make special educational provisions and to provide special psychological services for this group is to give inordinate emphasis to a very minor portion of the school population. It is hardly necessary to belabor any serious student of education with the argument that this small precentage of individuals constitutes one of the nation's most important resources, which should be found, fostered, and developed. Furthermore, in terms of absolute numbers, rather than percentages, the group is a large one. For example, in school systems of modest size, say 3,000, there might be an average of about 130 very superior and gifted pupils; in a very large system of about 100,000 pupils, there would be approximately 4,300; and in the entire nation, if there are 40,000,000 pupils in grades one through twelve, the number of "very superior" and "gifted" number about 1,720,000.

Characteristics. Although not so widespread as formerly, a number of misconceptions are still current among laymen regarding the characteristics of very superior and gifted children. Caricature and "folklore" would have it that these are physically small and poorly developed persons; that they are "queer," unstable, "one-sided," social rejects; and that most of them turn out to be average adults as far as intelligence and achievement are concerned. None of these notions is correct. For more than thirty-five years now, groups of exceptional children have been thoroughly investigated.[15] The following are their major characteristics revealed in these researches. These statements apply to the very superior and to the gifted as a group, there being, of course, individual variations. Each of the following statements, therefore, should be prefaced, by the reader, with the phrase, "as a group." Also, most of these findings are based upon studies of children having IQ's above 135.

Physical: They are, as a group, taller, heavier, and well developed; their general health is above average and continues to be so into adulthood.

Socio-economic: Their parents, as a group, have had much more schooling and are of higher intelligence than the average of the population; their parents are, much more often than the general population, in the professions or other higher occupations; their homes are, on the whole, provided with superior cultural and intellectually stimulating facilities.

Social and emotional: They are socially more mature than other children of their age; they are rated higher by their teachers on social and emotional characteristics; they prefer games requiring reasoning and judgment and that are favored by children older than themselves; they are not regarded as eccentric and unpopular.

Learning and education: They learn to walk and talk earlier than the average; much earlier than other children, they use a large vocabulary and their general language development is accelerated; they are unusually perceptive and retain information well; most of them show evidence of mental superiority in very early childhood; about fifty per cent have learned to read before entering school; after entering school, they have a strong interest in reading and in the more "abstract" school subjects; their interests are varied, and they often make collections; they can concentrate for longer periods than most children are able to; they are often proficient in one or more of the art forms; they early develop reasoning ability, so that they perceive relationships with insight; they rank well above their individual grades on school achievement tests, but individually, their "educational ages" are not as high as their mental ages, nor as high as could be expected of them; on the average, they are accelerated by a half-grade in their school placement; their superiority in school subjects and in psychological operations, although not altogether uniform, is general rather than specialized; their classroom work is not diffcult enough to challenge and stimulate them fully, with the result that boredom ensues, and they may develop habits of easy success or of indolence.

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[15] Goodenough, *op cit.*; Terman, *et al., op. cit.*; Witty, *op. cit.*

Fulfillment of promise: They do not decline and become "average" persons as they grow older; on the contrary, they maintain their intellectual superiority as measured by psychological tests and by educational progress; approximately 70 per cent of Terman's group of gifted men and 67 per cent of the women graduated from college, these figures being eight times as great as for the general population of California; advanced degrees were earned by 68 per cent of the men and 29 per cent of the women, the most frequent degrees being in law, followed by the M.A., the Ph.D., and the M.D.; average college grades were superior but not as high as might have been expected; a small percentage (men, 8 per cent; women, 2 per cent) failed in their college work, due no doubt to non-intellectual factors; of the men in Terman's study, 45 per cent were in the professions compared with 6 per cent of all California males; of the women in full-time occupations (other than that of housewife) 61 per cent were in the professions; their earnings are significantly higher than those of college graduates in general; their offspring are very significantly superior to the general population in regard to IQ's, 70 per cent being above 120 (general population, 12 per cent), 7 per cent *below* 100 (general population, 46 per cent); on the whole, considering the several categories of personality maladjustment, follow-up studies over a long period of years show that very superior and gifted children are at least as well adjusted in adult life as the general population.

Educational needs and provisions.[16] It is a major responsibility of schools to discern and cultivate mentally superior and creative individuals. How can this objective be most effectively achieved? This question has been dealt with in terms of curricular "enrichment," grade "acceleration," and compromises between these two practices. The answer to the question depends not only upon psychological considerations, but also upon administrative feasibility. In actual educational practice, it will be found that one of several procedures is being followed.

The "laissez-faire," do-nothing-special method, according to which superior and gifted children remain in the grades appropriate for their ages, without special attention or provisions, on the assumption that they will learn by themselves anyhow, and that social contact with all kinds of children is desirable. This procedure finds little favor among educators and probably none among psychologists.

"Enrichment" of curriculum and of courses of study while superior and gifted pupils remain in the grade appropriate for their age-group. This procedure, to be effective, requires sectioning within each classroom and considerable individual attention, both of which are extremely difficult in large, heterogeneous classes, since special methods, materials, and teaching abilities are needed for the slowest and the most able individuals within the group.

"Enrichment" through ability grouping, whereby a given grade is divided into different classes on the basis of ability, the range of ability within each class being relatively narrow. Special materials and methods are needed, taught preferably by specially selected teachers, since not all teachers are able to deal effectively with superior pupils. The possibility of using this procedure is limited by the number of pupils and the facilities within the school. An extension of segregation on the basis of ability is to have special schools for superior pupils. The nonfeasibility of this arrangement is obvious for all except the very large school systems.

Acceleration of progress through the grades as rapidly as the pupil's mental, physical, and social development will permit. Under this plan, the accelerated pupil receives instruction principally in the regular curriculum of each grade, with as much enrichment as his ability and the teacher's time will permit.

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[16] We shall not discuss the present surge of interest among politicians, journalists, and other laymen in the education of superior and gifted individuals. This has been a much discussed problem among psychologists and educators for many years; but it was a matter that did not excite great public interest or concern until United States government officials, politicians, and some elements of the general public began to fear that Russia was gaining scientific and technological superiority over the United States.

A combination of acceleration and enrichment, with an upper limit of, say, two years of acceleration, plus enrichment as an integral part of advancement in the grades.

The particular practice followed in a school will depend in part upon administrative feasibility, as already stated. But it will depend also upon the educational beliefs, unfounded or well-founded, of school officials and parents. So far as accelerated progress through the grades is concerned, psychologists who have studied the subject are agreed that the decision in the case of any particular pupil is an individual matter. The only generalization that can be made is that each pupil must be considered individually with reference to his physical and social development, and to his actual school achievement as well as his mental level. As a matter of fact, however, Terman, on the basis of his studies of gifted children, has stated that the dangers and undersirability of school acceleration have been very much exaggerated.

Views on the desirability of ability grouping within a grade are beclouded by people's social attitudes and values, educational philosophies, financial considerations, psychological misconceptions, and difficulty of obtaining well-controlled, comparable data on the educational effectiveness of relatively homogeneous grouping versus the heterogeneous class.[17] Nor is there agreement among educators with regard to procedures to be followed. The result, of course, is that all procedures, including laissez-faire, are found with varying frequencies in American schools.[18]

Regardless of which type of teaching is favored in any particular situation, it is generally agreed that education of superior and gifted pupils should emphasize certain other intellectual objectives, in addition to the acquisition of necessary and desirable information and skills. These other objectives include: analytic perception; the methods of problem-solving, employing analysis, synthesis, and conceptual thinking; utilizing a variety of available sources in the solutions of problems; an attitude of critical evaluation; scientific objectivity, so far as possible; independent study methods; work on a task until satisfactorily completed; encouragement of originality and creative effort; encouragement of special interests or talents, but not to the exclusion of the broader objectives already indicated.

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[17] On the basis of psychological theory and available evidence, I conclude that ability grouping combined with *individually determined* acceleration where warranted is the most desirable procedure.

[18] R. F. DeHaan and R. J. Havighurst, *Educating Gifted Children* (Chicago: University of Chicago Press, 1957); National Society for the Study of Education, *Education of Exceptional Children, op. cit.*, and *Education for Gifted Children, op. cit.*

It is very doubtful if these desirable goals can be achieved in a heterogeneous group of pupils whose mental levels are represented by intelligence quotients ranging from 140 (or higher) down to 75 (or lower). These aims cannot be attained merely by adding more of the same type of work given to less able pupils. The educational environment and personnel must encourage and promote exploration, originality, progress at individual rates, flexibility within a basic educational program. Optimally, as an essential part of such a desirable educational procedure, schools will need professionally qualified psychologists and guidance counselors to assist in the discovery of superior and gifted pupils, to analyze their aptitudes so far as practicable, and to help in their educational and vocational direction.

The mentally inferior

Mental inferiority is a matter of degree; we must, therefore, more or less arbitrarily draw a line for the purpose of classification. Our attention in this section will be given to the group usually designated as "mentally deficient" (also as "feeble-minded") and to another group generally called "slow learners." These two are best classified in terms of intelligence quotients; the former including individuals having IQ's of 75 or lower, whereas the latter vary from 76 to 89.[19]

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[19] We shall assume that the reader is already acquainted with the necessary cautions in interpreting an IQ: errors of measurement, impoverished environment, emotional and physical handicaps, language disabilities. In making a psychological examination of an individual for the purpose of estimating mental level, especially if a diagnosis of mental deficiency or feeble-mindedness may be involved, it is necessary to obtain information on and take into account these and additional nonintellective factors, such as economic adequacy, social development, family history, and others. The upper IQ limit of the mental deficiency classification is not uniformly given by specialists in the subject. Some place it as low as 60; many at 70. We are placing it at 75 because in some states (for example, New York), this is the maximum IQ acceptable for placement in a special class for mentally deficient children. The important fact is not the name given to a classification, but realization that a valid IQ of 75 or less signifies seriously limited ability to learn.

The mentally deficient are divided into three groups:

Idiots: Their IQ's vary up to a maximum of 25; for all practical purposes they are helpless; they cannot care for themselves; often they are unable to feed or dress themselves, to keep clean, or to protect themselves from ordinary physical hazards; occasionally one of them can care for himself to a very limited extent under close supervision. They are not educable at all; nor are they "trainable" to any significant or useful degree.

Imbeciles: Their IQ range is from 26 to 49; they require a great deal of supervision and care; with patient, long, and frequent repetition of most simple activities they can be "trained" to care for some of their personal needs and under supervision to do the simplest manual labor that does not require more than a minimal degree of motor co-ordination. Sometimes individuals at the upper level of this group are found in public schools. Since some of these very seriously deficient children are "trainable" to a very limited extent, pressure from parents and some others has been growing to force enactment of legislation that would make it mandatory upon school officials to set up classes for children at the level of imbecility.[20] The laws of some states permit schools to exclude children who have IQ's under 50 on the grounds that they are uneducable. About one-fourth of one per cent of children have IQ's below 50.

Morons: Their IQ's range from 50 to about 75; with difficulty and repetition, and very slowly, they are able to learn a very limited amount of elementary reading, writing, spelling, and arithmetic; they can be trained in unskilled work, and in some few instances in semiskilled, but they require more than an ordinary amount of supervision. About 5 per cent of the school population have IQ's below 75; about 2.5 per cent are below 70 (based upon standardization population of the 1937 Stanford-Binet scale). Thus, in terms of numbers and possible effectiveness of schooling, the group of defectives at the level of moronity present a major school problem.[21]

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[20] It is my strong belief that children at this level of mental deficiency should not be in ordinary public schools. To place them there is to make custodial institutions of what should be educational institutions. These children cannot learn school subject matter in any true sense. Their placement in ordinary schools is unfair to them, as it is also to the more able pupils and to the school staff; for these very deficient children syphon off time, energy, and financial resources that should be devoted to pupils whose education will be of benefit to themselves and to society.

The characteristics of the mentally deficient, *as a group*, may be summarized as follows:

Physical: they are shorter, lighter, and less developed than children of average or superior mentality; they are more susceptible to disease; their general health is inferior to that of groups of normal individuals; they have more physical anomalies (eyes, ears, vascular system, head shape, facial assymmetry, defects of speech mechanism).

Socio-economic: their parents are more likely to have had less schooling and to be of lesser ability than the general population, although the range is wide due to the fact that many cases of mental deficiency are the result of pre- or post-natal brain damage; their family incomes, their homes, cultural facilities, and communities tend to be below the average.

Social-emotional: in social development they are less mature and less capable than average and superior children; they are often rejected by children of their own age; they often prefer the companionship of children younger than themselves; they cannot participate adequately in the play of children of their own age group; economically, they are much less likely to be adequate.

Learning and education: most of them give evidence of retardation in early childhood; they are retarded in school grade and in school achievement, frequently by two years or more. At this point, the reader should refer to this same category of characteristics describing superior and gifted individuals, and he should apply the *opposite* of their qualities to the mentally deficient.

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[21] There is at present an unfortunate tendency on the part of some educators and a few psychologists to "sugar-coat" the terminology; to try making it less "offensive" and more innocuous. They, therefore, would substitute "mild subnormality" for moron, "moderate subnormality" for imbecile, and "severe subnormality" for idiot. These terms are entirely inappropriate because they misrepresent the degree of retardation; an IQ between 50 and 75 is much more serious, in terms of learning and social effectiveness, than is conveyed by the term "mild"; an individual with an IQ between 26 and 49 can learn nothing of ordinary school subjects, so that "moderate" is hardly an appropriate term; IQ's of 25 and below represent individuals who are unteachable and untrainable, hence they are not only "severely subnormal," they are extremely and hopelessly defective. To use these "sugar-coated" terms is to disregard their meanings and connotations.

Status in adolescence and adulthood: individuals who are mentally deficient because of genetic defect or of brain injury do not "grow out of" their earlier defective status; individuals who are "pseudo mental deficients," or "cultural mental deficients," by reason of prolonged environmental deprivation may, under markedly improved conditions, be raised in mental level;[22] medication does not "cure" or alleviate mental deficiency, except in the case of cretins if their treatment is begun in infancy and maintained throughout life; the mentally deficient are employed in the lower occupations and their earnings are lower than that of normal groups; there is more unemployment among them; they provide a disproportionate number of delinquents and socially irresponsible individuals.

The slow learners: this group of pupils, whose intelligence quotients fall between 76 and 89, present a serious and difficult problem to public schools because they constitute a large segment of the school population (about 18 per cent) and are capable of only poor quality, slow, and limited school achievement. Their characteristics, as far as schooling is concerned, are these: their ability to deal with abstract and symbolic materials (language, number, and concepts) is very limited; their reasoning in practical situations is inferior to that of average persons; attention span is relatively short; they are unable to interrelate a series of instructions or elements, so that they are unable to deal with relatively complex games or school assignments; they must be provided with relatively small units of work of a simple type; they require much more supervision than do more capable pupils; they require much external stimulation and encouragement; their understanding of rules of conduct in play and other social situations is inferior to that of average individuals; they are appreciably retarded in school achievement, their work being slow and of inferior quality; they are often retarded in school grade.

Educational provisions for the mentally inferior. From the foregoing descriptions of the several levels of mental inferiority, it is obvious that each group must be considered separately, as far as schooling is concerned.

The lowest group (idiocy) need not concern us, for they are uneducable and untrainable. They are either kept at home under very close supervision or they are placed in an institution.

The imbecile group, as already stated, are untrainable to any appreciable or significant degree and should not be in public schools. Such training as they are capable of benefiting from will be in the formation and fixing of habits of personal care and self-help. This can be accomplished in the home with the aid of "visiting teachers," provided that the parents themselves are willing and psychologically able to cooperate. Individuals at the imbecile level are, however, often placed in schools for the mentally deficient.

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[22] The "pseudo" or "cultural" deficients are, nevertheless, markedly inferior as far as psychological *functioning* and *mental operations* are concerned.

Schooling for the moron group can be provided in public schools if special classes for them are available. To keep them in ordinary classes is psychologically unsound. Because they are unable to learn well enough, their inferiority is cumulatively impressed upon them, and they experience repeated frustration and defeat. Giving them "individual attention" in a heterogeneous class group is ineffective, and, furthermore, such attention consumes the teacher's time, energy, and attention, which can be better devoted to more capable learners.

Children with IQ's of 50–75 (sometimes called "educable mentally handicapped," another euphemism) require special school facilities and specially qualified teachers, for methods and materials of instruction are quite different from those in other class groups.[23] Basically their training is directed toward their better "adjustment" to community life than would otherwise be the case. They are given training in the essentials of the basic school subjects, through use of concrete, functional, and practical materials and exercises. Manual, motor, and sensory training are emphasized. Household skills (for girls especially) and simpler handcrafts are taught, as far as their limited capabilities will permit. (It is not to be assumed that mentally deficient persons can achieve a highly creditable level of performance in these either; there are occasional and infrequent exceptions who, however, are not creative.) Health and physical education are provided, as is speech training designed particularly to improve their often defective articulation. Emphasis is placed on "character training" through practical social and group activities in the school, or in the community if feasible. The goal of a schooling program for these mentally deficient pupils is to make them socially useful in some degree, if possible; and, conversely, to reduce the probabilities of their becoming social liabilities. Individual attention and adaptation of instruction are essential.

Slow learners (intelligence quotients of 76–89) are, naturally, capable of more learning than the lower group but of less learning than average persons. In this group, individual adaptation is essential. Their schooling consists of acquiring a practical working knowledge of tool subjects; prevocational shop and manual work, together with occupational information; attention to leisure time activities, as well as to the usual (but adapted) instruction in health and physical education. Throughout, their instruction will be made as nearly functional as possible. In this group of slow learners (sometimes called "borderline" cases) there are some individuals who can be trained in semiskilled trades, and a small percentage can learn skilled trades. Since "slow learners" constitute an appreciable fraction of our population, they are an important group in educational planning. Their educational development can be best promoted in schools that are able to provide ability grouping, preferably in separate classrooms; or, otherwise, if necessary, by sectioning within a more or less heterogeneous group.

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[23] S. A. Kirk and G. O. Johnson, *Educating the Retarded Child* (Boston: Houghton Mifflin Company, 1951).

Concluding statement

We must conceive of the child's education as beginning at birth. It is more than formal schooling, which is but a part of education and at times a small one. Since a person's abilities, as well as his traits of personality and physique, are the products of the integration of inherited potentialities and environmental forces, the importance of an optimal environment for mental growth is apparent. The significance of favorable conditions very early in the child's life has been demonstrated by studies in which it was shown that children attending preschool institutions make advances in intelligence that are lasting and real. And educational forces continue to exert their influence throughout the entire developmental period. Therefore, we must regard the duration, quality, and intensity of educational forces as influences of the first order in the production of individual differences in mental abilities. This does not mean, of course, that equalized opportunity for mental development will make all children equally competent, for we must still reckon with the great differences in genetic constitution. It does mean, however, that for the full realization of every individual's capabilities, it is essential that a favorable environment be provided.

Since it has been shown that all levels of mental ability are found in all social and economic groups, although in markedly varying proportions, the education of any child becomes an individual matter.

Nor should an educational program be limited by sex membership insofar as it concerns mental abilities as such, in spite of the minor differences noted with respect to language, arithmetic, and memory. The differences between the sexes in interests and aptitudes are not the results of sex-linked psychological characteristics. They are to be attributed rather to social forces which, operating from very early childhood, produce true and significant differences in abilities in the end-products. Sexual differentiation in education in certain fields may be desirable on a basis of social factors and, in some instances, physical or physiological factors. The soundest procedure, however, is to educate individuals in a manner consistent with their abilities, interests, and non-intellectual traits of personality, and to minimize the sex factor as such.

There is an optimal period for the nurture and utilization of genetic potentialities; unfavorable or impoverished environments during that period will retard or restrict mental development. This doctrine denies that mental development is a mere unfolding process or that mentality will develop in a vacuum. It denies also that environmental forces may only *help* or *hinder* the process of development. It states that *conditions of nurture are themselves an integral part of the process of development.* If this doctrine were not true, it would be necessary to discard the doctrine that education is more than the absorption of information and the fixing of habits. On the contrary, however, educators are psychologically and biologically justified when they speak of education as growth, as the development of individuality, and as enabling the individual to approach the maximum realization of his potentialities.

QUESTIONS AND EXERCISES

for discussion and study

1. State the reasons for having a psychologist available in all schools.
2. What reasons (psychological and other) can you present against ability grouping of pupils, in separate classrooms, for purpose of instruction?
3. If a high-school pupil having an IQ of about 135 has a choice between studying a second foreign language or entering a course in shop work, what would you recommend? Give your reasons.
4. Taking into account the materials in this chapter and others in this book, under what conditions would it be advisable to place a mentally deficient child in an institution for such persons?
5. On the basis of what you know about the psychology of learning and about individual differences, what criteria do you believe should be used in admitting students to college?
6. Make a list of personality traits that can adversely affect the functioning of a superior intellect. Explain why each trait can have such an effect.

7 Are there personality traits that can in part compensate for mediocre or inferior ability? Explain your answer.

8 Study the parental occupations and education and the home backgrounds of children of superior intelligence in a given school or classroom.

9 Do the same, as in question 8, for mentally inferior children (say, those having IQ's of 75 or lower).

10 Make a frequency distribution of IQ's of 100 or more boys who are in two adjacent grades. Do the same for 100 or more girls. Compare the two distributions.

11 Select at random as many superior school children as you can locate. Make a statistical table showing their national backgrounds (English, French, and so on) and racial membership (white, Negro, other).

12 Does our knowledge of interests and special abilities warrant special curricula at the high-school level to provide for these cases? Explain.

13 In view of present knowledge of mental growth and decline, and in view of the increasing life-span, what specific suggestions would you make regarding adult education?

14 Prepare a table showing heights and weights of two groups: mentally superior and mentally inferior. Compare them, taking into account the statistical significance of your data.

15 In what characteristics would you say groups of children are more nearly alike than different? Specify the group you are concerned with.

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